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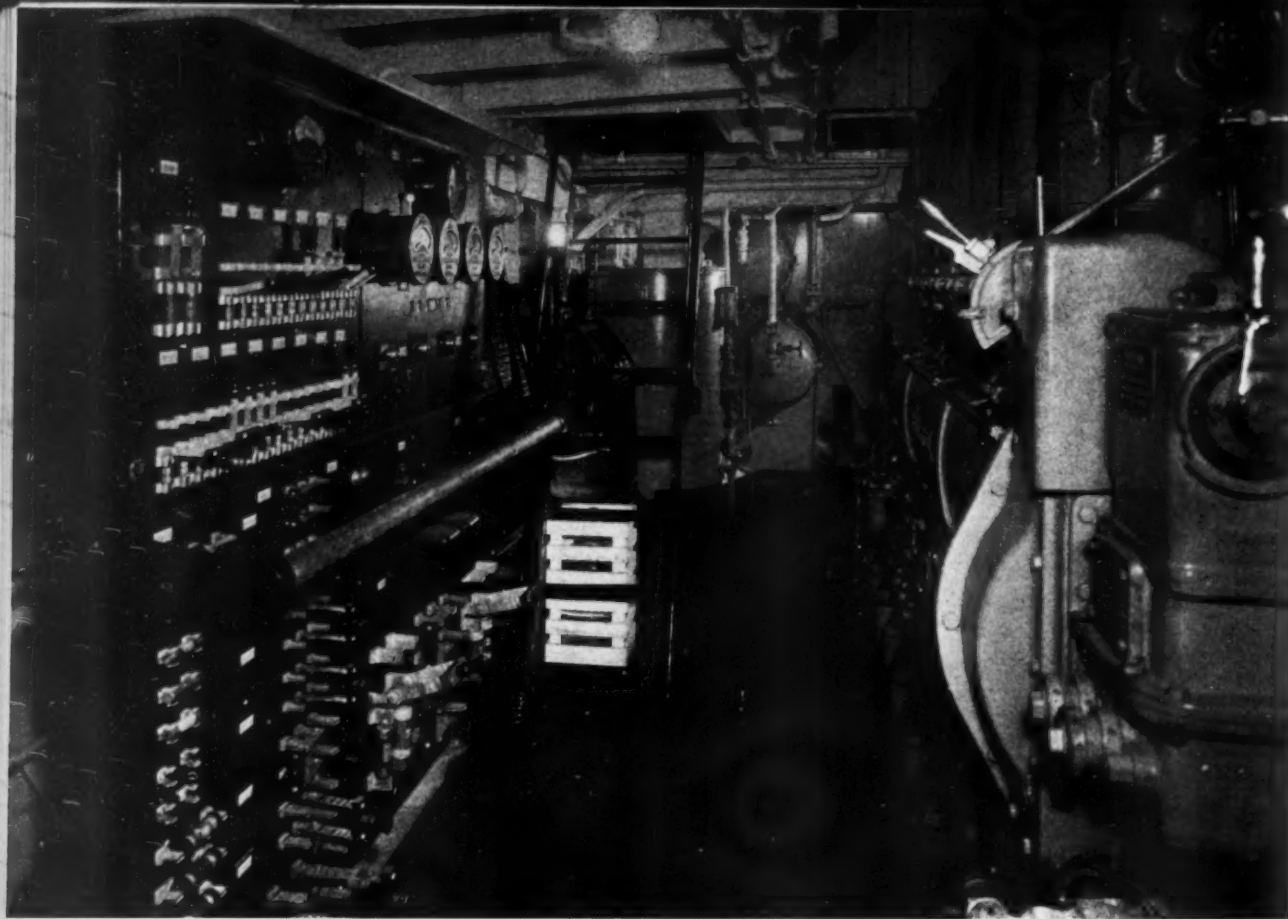
DIESEL

GAS ENGINE

PROGRESS



CCA



View looking aft along operating side of the Enterprise main Diesel with the switchboard seen left.

LEVINGSTON Shipbuilding Company has turned out a large number of hulls to its own design—all of good reputation—of which the Diesel tug *Scout* is a duplicate in all respects except her machinery, the main engine being a 400 hp. Enterprise Diesel. Many of the Livingston craft have been described in **DIESEL PROGRESS** but for the readers' convenience a brief review of the hull dimensions is given.

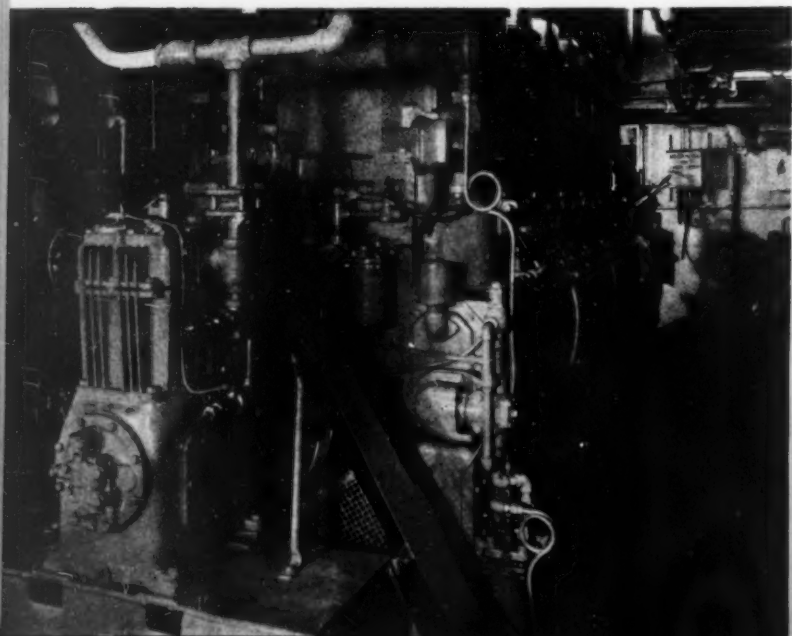
Scout is 75 ft. overall length, 20 ft. molded beam, 9 ft. 1½ in. draft aft. She is designed for Inland Towing Service and built to Class A-1 American Bureau of Shipping for that type of service. She entered the vital War-time towing Trade the middle of last October.

Accommodations, all above decks, are arranged fore to aft on the main deck with crews quarters forward, galley next with built-in refrigerator equipped with a Delco Products motor driven Nash-Kelvinator unit; aft of the galley is the engine room casing, followed by additional crews quarters. Surmounting the upper deck is the raised pilot house with dog house below the Captain's Cabin.

The *Scout's* machinery is impressive in both makeup and arrangement. Her main engine, set midships, is a compact and clean looking Enterprise Diesel of six cylinders, 12 in. by 15 in. rated 400 hp. at 400 rpm. This is a direct reversible propulsion unit with shaft driven

Quincy starting air compressor. The lube system is fitted with a Nugent duplex filter and Hilo Reclaimer. The tachometer is a Weston electric instrument, with dials in engine room and pilot house, and the pyrometer is an Alnor. The main engine gauge panel carries Ashcroft gauges for showing lube oil pressure, starting air pressure, circulating water pressure, and sea water pressure also a U. S. gauge for fuel oil pressure. The jacket water cooler is a Thermexchanger and the fuel filter is a Purolator duplex unit.

Aft end of main engine with shaft driven compressor.



Port and starboard Buda Diesel auxiliary generator units with auxiliary motor driven compressor, center.



DIESEL TUG

SCOUT
DWIGHT

Two auxiliaries for lighting port and starboard and are composed of 6 cylinders, 1200 rpm, 15 kw. generated by the Westinghouse auxiliary Moore characterization of

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"SCOUT"

DWIGHT ROBISON

Two auxiliary generating sets supply current for lighting and services. These are installed port and starboard, forward of the main engine, and are comprised of identical Buda Diesels, of 6 cylinders, 5 1/8 in. by 3 3/8 in., operating at 1200 rpm., direct connected to Allis-Chalmers 15 kw. generators. Between these two units is the Westinghouse motor driven, Gardner Denver auxiliary air compressor. A 1-ton Chisholm-Moore chain hoist serves the engine room. Ventilation of engine room and quarters is provided

by two 11g Electric fans installed port and starboard in the forward engine room. These fans are driven by 1/2 hp., 1300 rpm. Wagner Electric Motors.

The switchboard, installed to port of the main engine is a Cline Electric product and carries Jewell meters for each generator, Cutler-Hammer rheostats, and Hartman automatic switches for each generator.

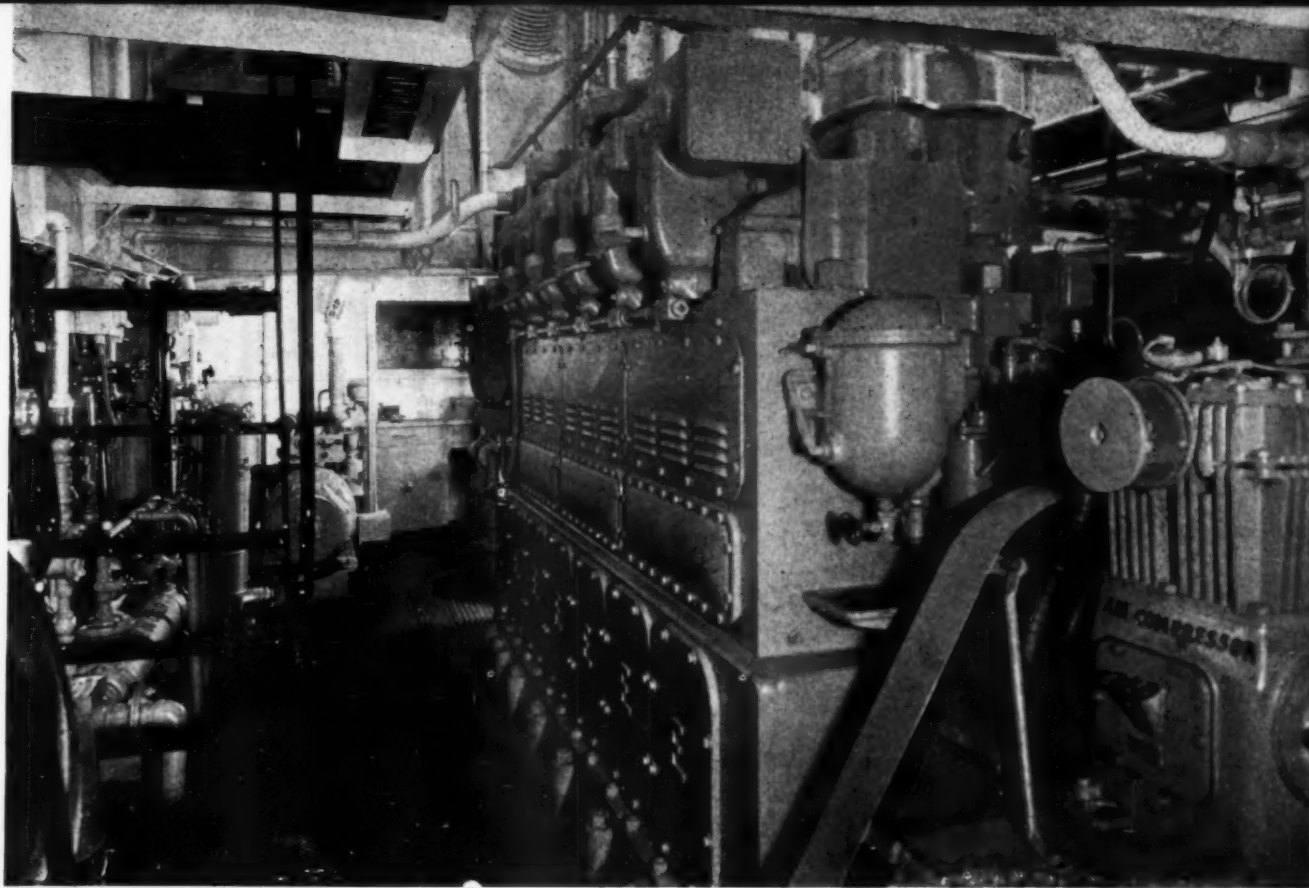
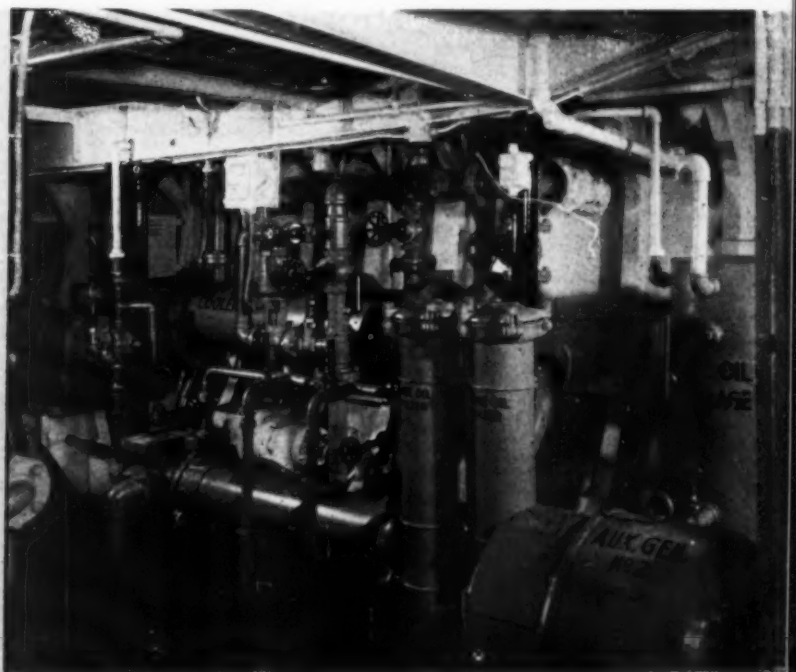
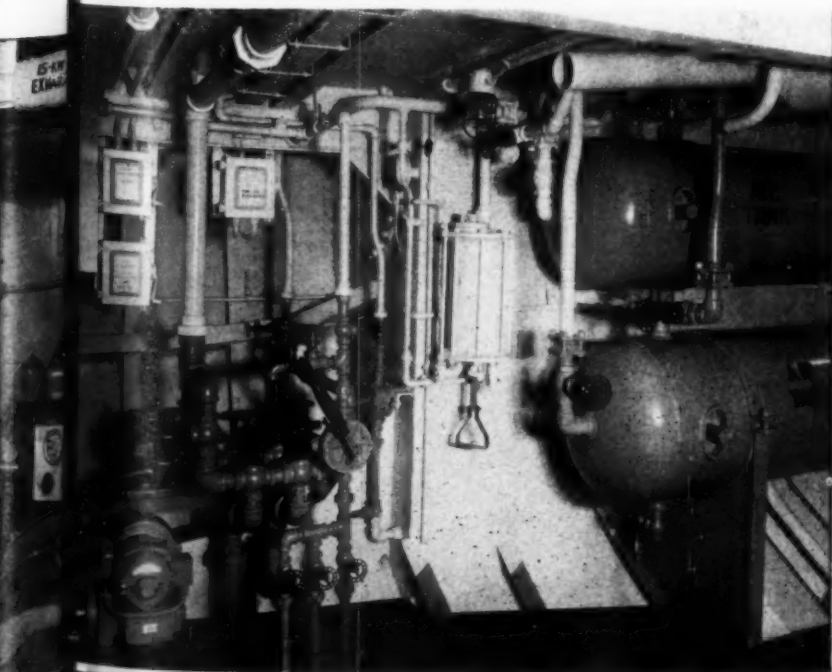
The Scout is well set up with operating and navigating devices including Radio Marine telephone, John E. Hand & Sons compass, and Binnacle, Doran air horn, port and starboard searchlights and a Booth, 12 ft. life boat. The

manual steering gear is of Livingston design and manufacture.

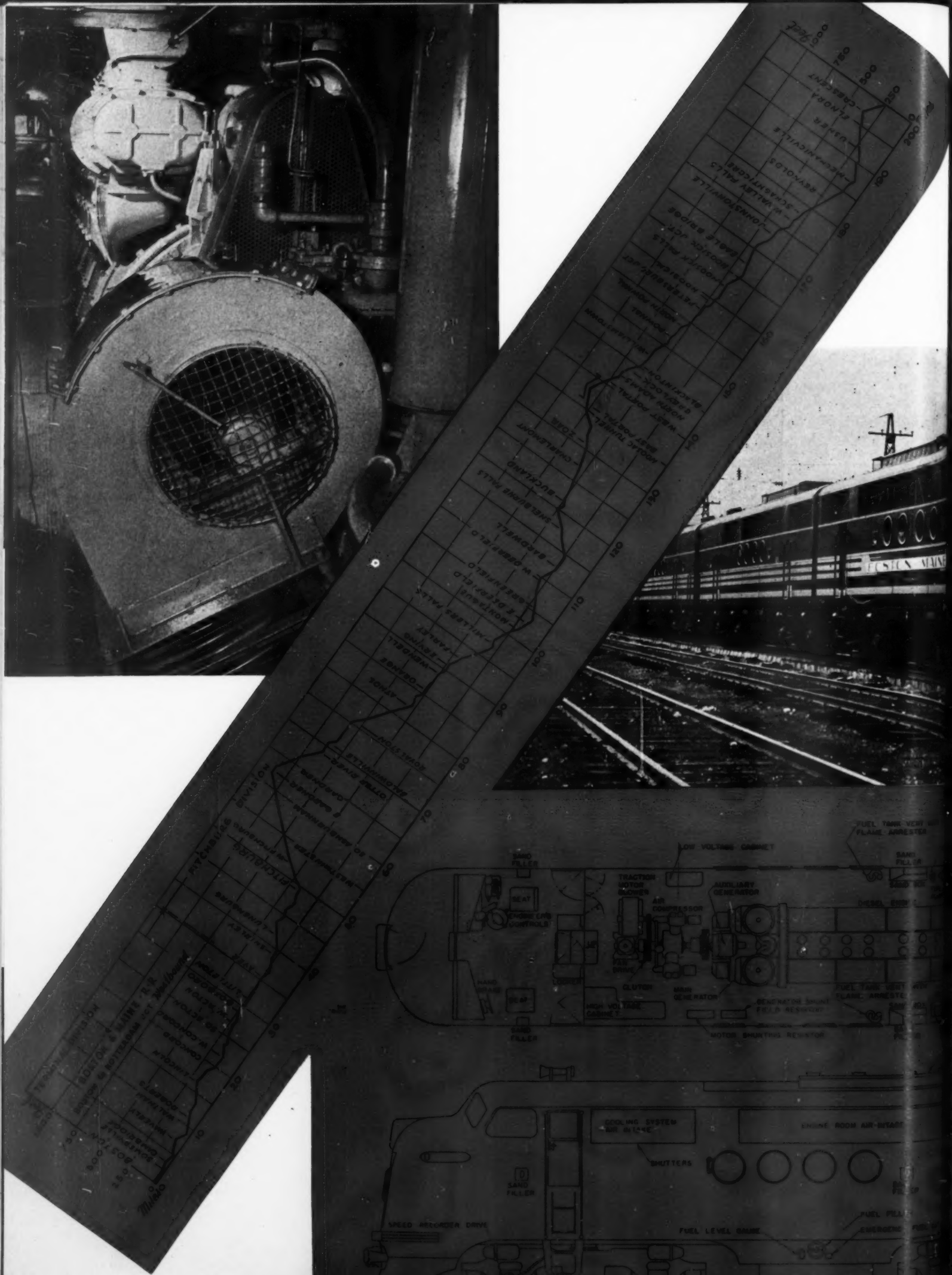
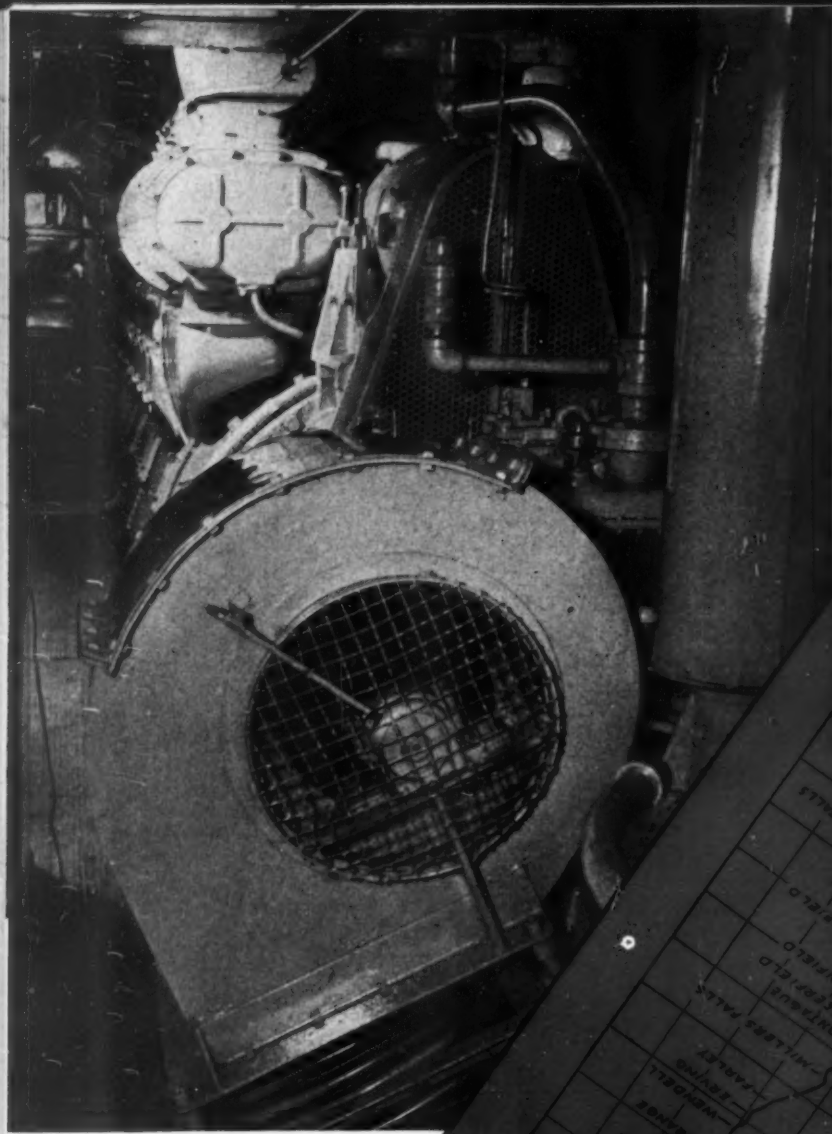
Reversing of the Enterprise main engine is accomplished by the sliding cam shaft arrangement. The shaft is moved to fore and aft positions by a constant torque air motor with reversing and throttling control combined in one lever. Movement of the control lever by hand or from the remote control station actuates the mechanism for movement of the cam shaft, throttling admission of starting air, and starting the engine in either direction. This arrangement which assures rapid reversal of the engine adds greatly to the maneuverability of the vessel—a highly desirable feature in towing service.

Arrangement of port air tanks, right and fuel oil hand pump, also fuel oil transfer pump, left.

Nugent duplex lube oil filters, center and Thermex-changer water and lube coolers, left.



Exhaust side of main engine with Quincy air compressor, right foreground and port generator, left background.



BOS

A four-unit freight locomotive on the 5-mile H&M.



BOSTON & MAINE RR. INTRODUCES DIESEL FREIGHT LOCOMOTIVES TO COLONIAL AMERICA

By CHARLES F. A. MANN

A four-unit Electro-Motive Diesel freight locomotive about to enter the 5-mile Hoosac Tunnel on the B&M.



AT THE beginning of the Streamliner era 10 years ago, the Boston & Maine and Maine Central pair of railroads gave New England its first Diesel passenger train, following close behind the Burlington and Union Pacific with the now famous Flying Yankee.

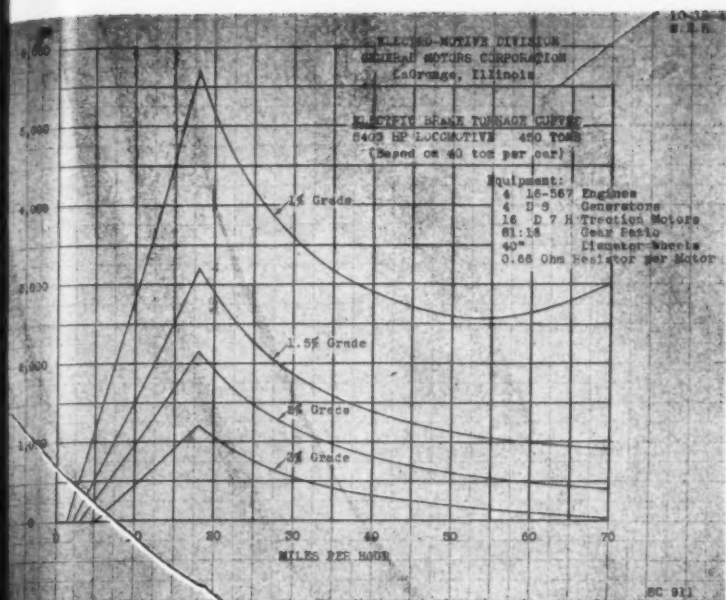
Like dozens of other key American systems, accumulated reserves of various types of coal-fired steam power delayed the extension of Diesel motive power until those mysterious railroaders' charts showed a sufficient number of important lines crossing or meeting one another, all in one spot marked "*Diesel Electric.*" Those lines met in 1943 and later in the Fall the heavily loaded Boston-Mechanicsville main line, No. 1 New England Rail gateway between the Pennsylvania-Illinois-Ohio-New York and "West" and the New England states, received two 5400 hp. 4-unit General Motors Diesel freight locomotives, first of a big order of 12 costing more than \$6,000,000 that will provide motive power sufficient to haul twelve 4,500 ton freight trains, each way, every day all the way across the rugged

Massachusetts hills from Boston to the Hudson
River gateway near Albany-Troy, New York.

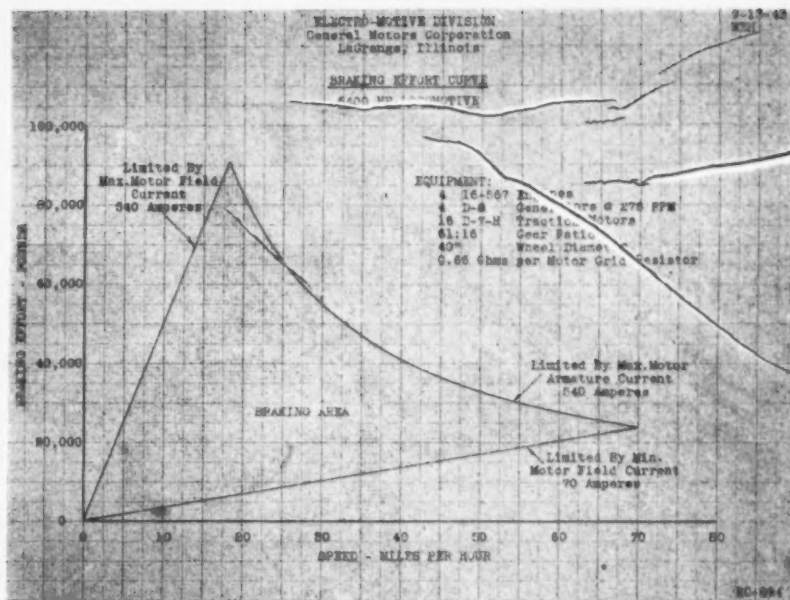
Not for a pair of fast Highball Freights, but for almost all of the through freight movement across one of America's historic rail routes, built to connect Boston and the Hudson River 100 years ago. The Boston & Maine believes in doing things up completely Brown, so to speak, when its wise policy-makers start spending stockholders money for a major, strategic operating improvement.

Needless to mention, these 12 General Motors freighters represent the cumulative experience in building motive power for freight trains that began in the summer of 1942, when No. 1 General Motors Diesel Freight Loco made its now famed 250,000 mile transcontinental goodwill tour on every line that would permit it. This, DIESEL PROGRESS readers will remember, was followed by the first railway-owned freight unit in February 1941, on the Santa Fe. And lest we forget, both these locomotives were

Plan side elevation of the two-unit Electro-Motive Diesel-electric locomotive. The plan provides an interesting study of the machinery arrangement.



Electric Brake tonnage curves for the 5400 h.p. locomotive.



Braking effort curve for the B&M Diesel Freight locomotives.

even with electricity generated by waterpower if this could be made available!

Perhaps the remarkable thing about the locomotives themselves is not the equipment and dimensions, but the fact that in three years of modification and revision of designs and gadgets, there have been so few basic changes, and secondly, the regenerative electric brake, or dynamic brake as slogan-minded General Motors loves to call it, has proved its value and appears here in a completely standardized and simplified version. It will be remembered that when GM Diesel freighters No.'s 1 and 2 came out, the whole subject of getting a heavy train downhill, quickly, received as much thoughtful study as the matter of getting it uphill. Not since the Milwaukee pioneered regenerative braking 35 years ago on its electrified lines had there been any attempt made to give this heat-proof, smooth, jerkless, money-saving idea to other forms of railway power.

But the idea was sound, and now they can roll a B & M freight train downhill out of East Gardner and So. Ashburnham on a 1.1% or a 1.2% grade at 50 miles per hour, flip the transition lever (now doing dual duty as a transition-dynamic brake control handle), over to the first brake position, then, as the slack works out of a long drag, on to the maximum position, and ease the rolling monster to 15 miles per hour, thence to a neat, quiet stop at Fitchburg, Mass., with one medium application of the automatic train brake system! When the dynamic brake was first born, you gingerly brought the load to a dead stop at the top of the hill, with the air

brake system, put the lever in one of three positions and let off the air. If the engineer's mental calculations were correct, the train rolled downhill at 18 or 25 or 30 miles per hour, unvaryingly, but with little actual braking flexibility on this type of control system.

The change has been made by simply utilizing the four main Diesel generators, usually idling at around 300 rpm. when going downhill—just enough to keep them warmed up—for excitation of the field windings of the traction motors. This makes them separately excited generators, during braking, and the current output of the traction motor armatures is dissipated in the air cooled grids mounted in the cab roof, directly above the Diesel engines, between the engine water radiators located at both ends of the roof structure. Main generator field windings are controlled by a hand operated rheostat in the operating cab. The grids in the roof are cooled by a motor blower using the waste electricity, and as the load on the regenerative system increases, the speed of this blower increases, automatically. The hotter the grids get the more air is blown through them.

So beautifully has this worked out, that a 5400 hp. Diesel freight locomotive will deliver a 4300 hp. braking effort at a speed of 18 miles per hour, and reach a maximum of 91,000 lbs. of braking effort against a train, with smooth control that can be cut in at the locomotive's maximum speed of 70 miles per hour, with very light braking effect, rapidly increasing to its maximum at 18 miles per hour, and falling off rapidly as the speed falls below this point,

reaching about 10,000 lbs. of braking resistance at 3 miles per hour and 5,000 lbs. at 1 mph.

The accompanying three charts, not heretofore published in any journal, give a graphic picture of the electrical hookup of the brake, and performance. In the case of the B & M, maximum speed over the hills and flexibility of the braking system is obtained with a 3500 ton train operated at 30 miles per hour. The entire performance is only limited by the maximum traction motor armature current of 540 amperes, which occurs in the period when the brake position lever is moved to its farthest notch, while, in turn, the braking effect is at its minimum level when the lever is at its first notch, and the motor field current is at 70 amperes. This makes the braking effect optimum in the speed range of from 10 to 40 miles per hour train speed, where the total braking effort goes above 45,000 lbs. "drawbar push" on up to 90,000 lbs. at the 18 mile per hour speed of the train. This 45,000 lbs. braking effort is usually sufficient to handle all ordinary speed reducing periods in normal train operations, except with very heavy loads on 2.2% mountain grades, where speeds under 25 miles per hour are necessary if the train is to be held back without using air brakes at all.

The improved dynamic brake system makes it possible to even brake a train on level ground, when approaching sidings, rolling down light grades, coming into terminals or acknowledging slow orders—impossible without the use of the main Diesel generators to excite the motor . . . And now please turn to page 80 . . .



ARMY TRANSPORTATION CORPS 96 FT. DIESEL TUGS

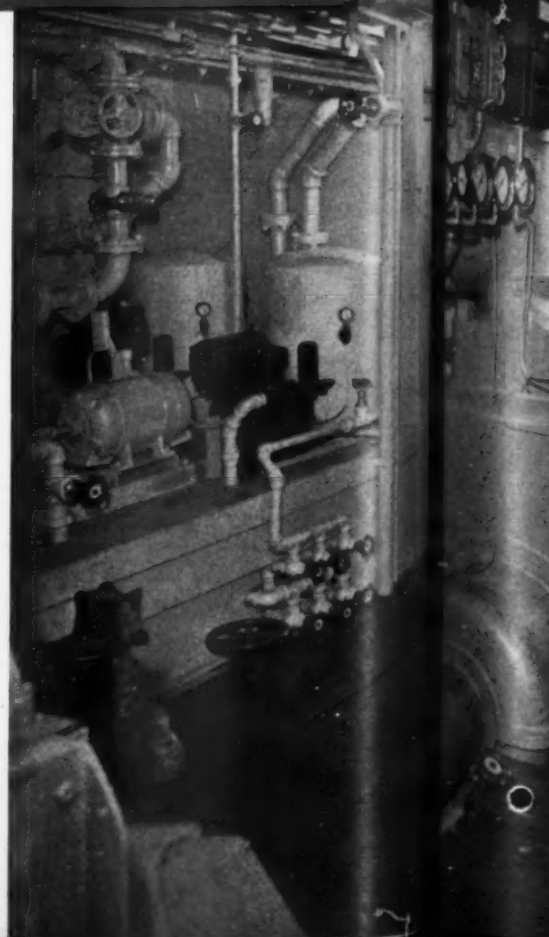
By CHARLES F. A. MANN

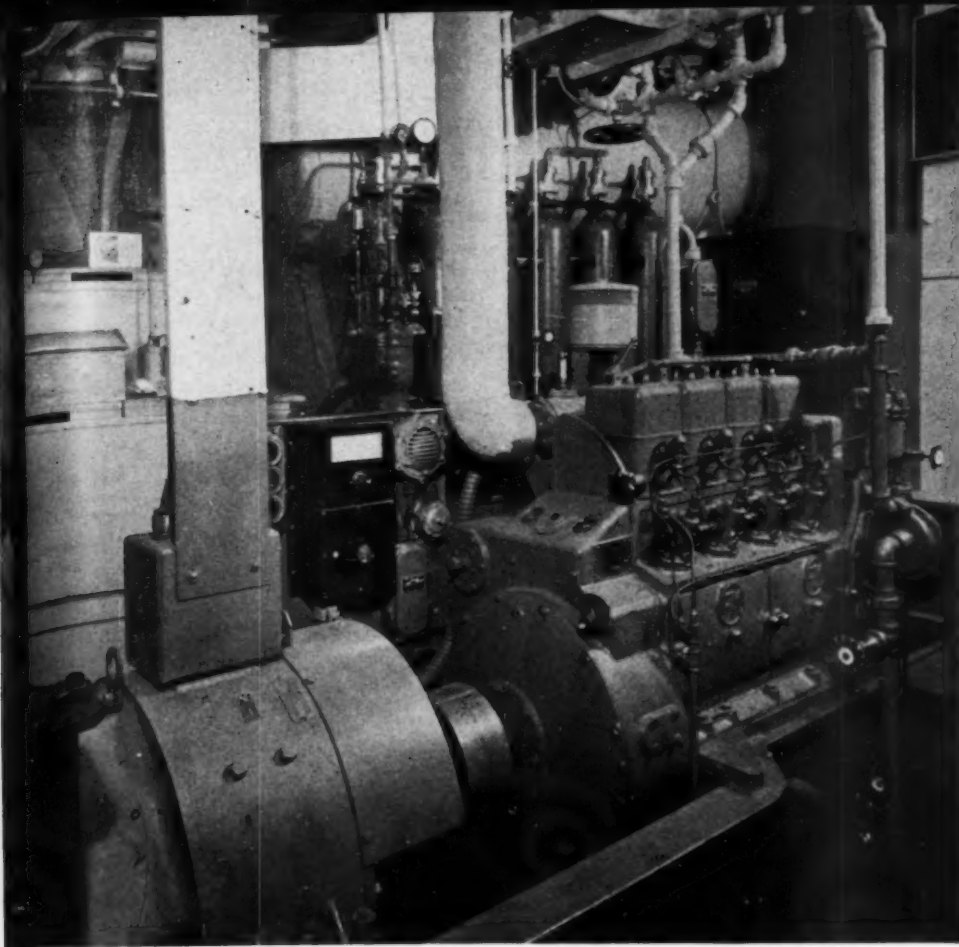
WITHOUT a doubt the TP Class of tugs for the U. S. Army Transportation Corps at Seattle is one of the most complete and beautiful tug designs to ever come off the boards of Leigh H. Coolidge, veteran, bewhiskered Yankee Naval Architect of Seattle, whose work with Wood & Diesel is known round the world.

Newest and possibly first of this class of Army tugs for its vast new workboat fleet, is the *TP 224*, originally contracted to Puget Sound Boatbuilding Company at Tacoma, but later subcontracted to the veteran Petrich organization there. The *TP 224* was built at the Petrich family's new, "Father & 4 Sons" Shipyard, the Petrich Shipbuilding Corporation, completely under cover in the same new plant on City Waterway that turned out the big Army freighters reported in the August 1943 issue of **DIESEL PROGRESS**.

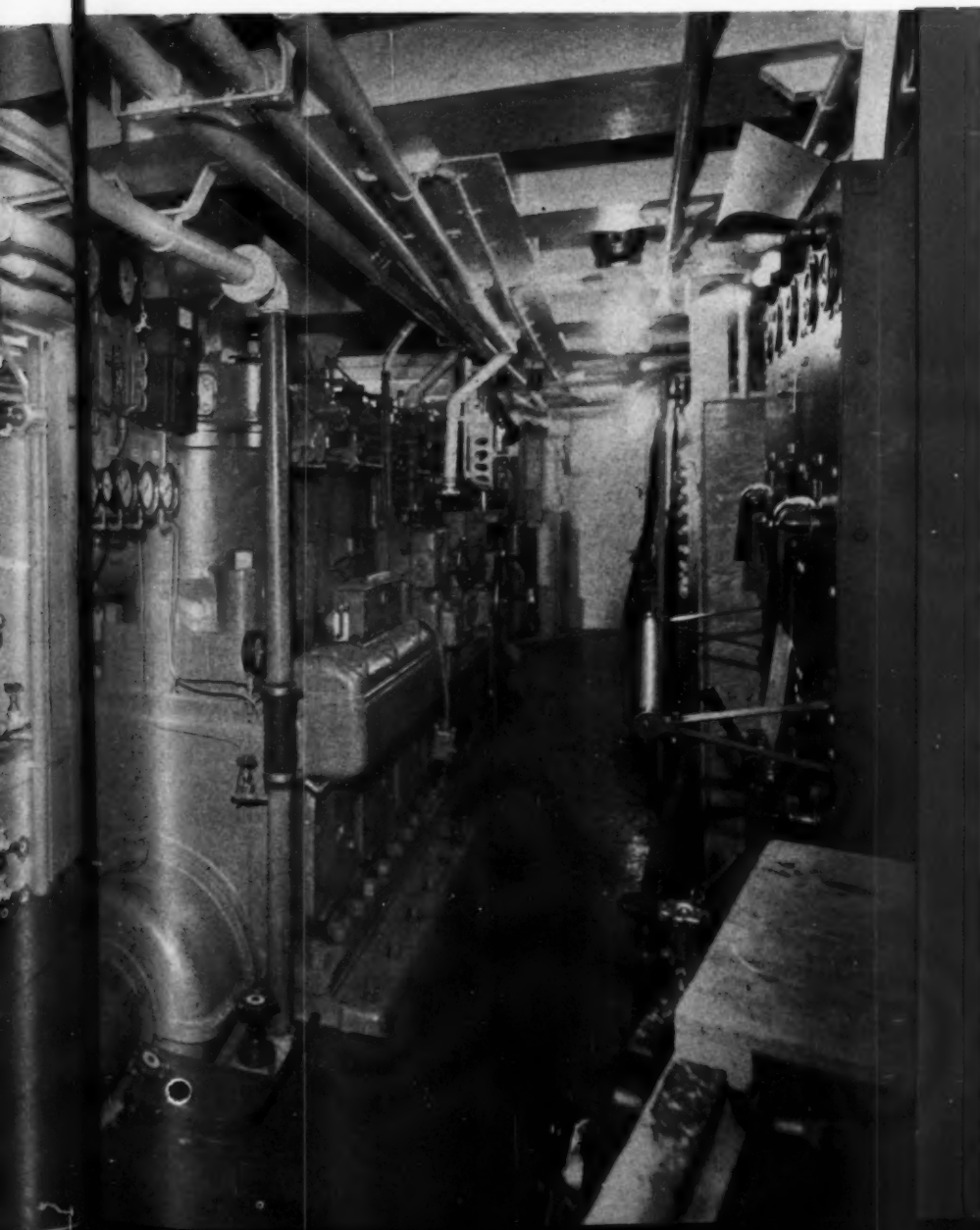
This class of tugs is sort of halfway between the giant 127 ft. twin screw 1200 hp. models and the little 72 ft. Harbor tugs, likewise Coolidge designed. Incidentally the entire Army wood & Diesel program in the Northwest has been under the supervision of Mr. Coolidge, now on leave with the Army as Chief Naval Architect and Designer. Fifty of his ships will "see the water" in the North Pacific before the current program is finished, and the Army will proudly boast of one of the most economically built, finest appointed fleets of workboats of any nation in the world. And needless to mention the Diesel industry will supply over 100

Fairbanks Morse, 450 hp., 2 cycle, 6 cylinder main Diesel on the "TP 224." Mounted on the gage panel are Viking safety controls and Alnor pyrometer.





The auxiliary generating unit is a 4-cylinder F-M Diesel direct connected to a 25 kw. G-E generator. Note Alnor pyrometer, center.



engines for this fleet, some of which have four Diesels in one engine room!

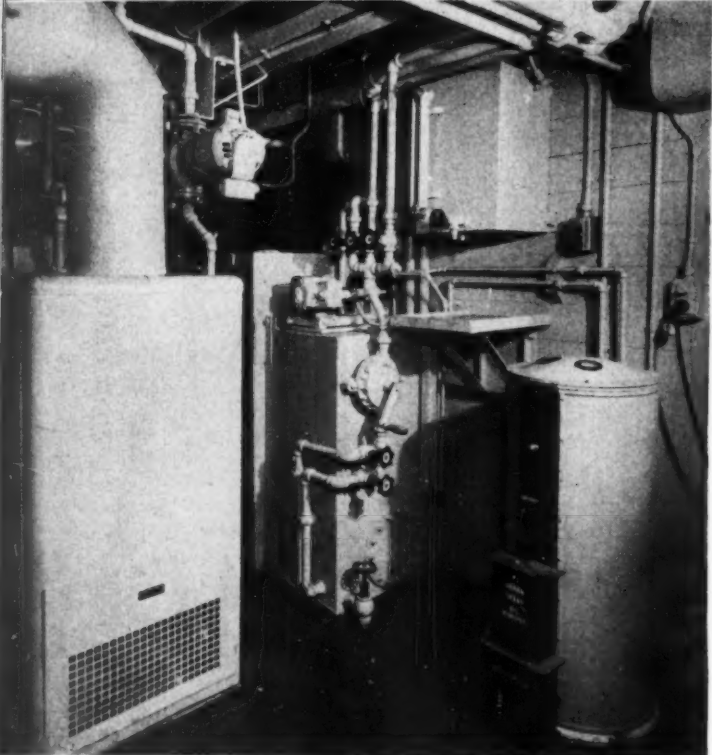
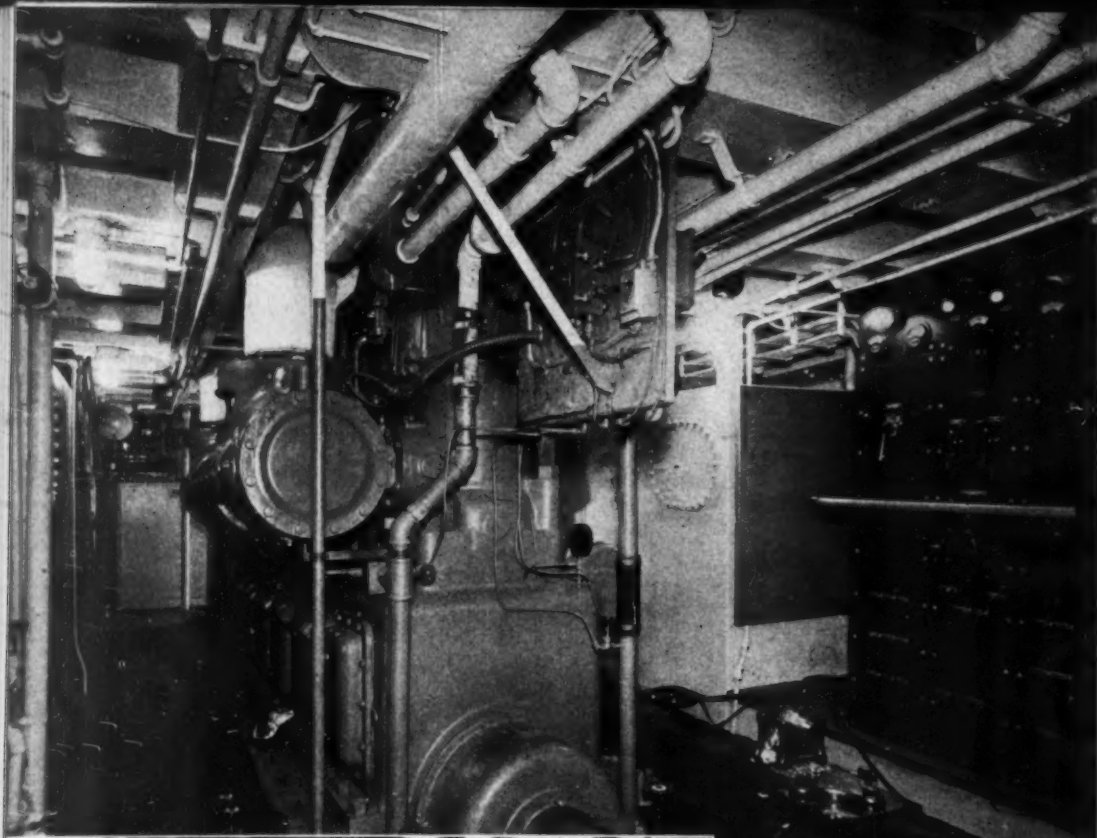
Commercial operators, looking with a cold eye to practical operation in the postwar era, regard the 96 footers as the answer to Tugboat Annie's prayer, for they are complete, comfortable, can go anywhere, have ample storage and fuel capacity to cover long coastwise tows and will please the most cantankerous of crews that can be found under the table in any Pacific Coast port.

And their 450 hp. Diesels aren't too costly to operate. A modified version—supposed to be the "Original" of just what Architect Coolidge had in mind, calls for 650 hp. Diesels instead of 450 hp. These larger engines fit the hull design and machinery space as neatly as do the lighter and more economical 450 hp. Diesels, and there is little difference in the operation and speed—except more lugging power with a bigger tow.

The spacious engine room, the very commodious and almost luxurious crew's quarters, consisting entirely of 2-man staterooms, lack of cramped, stuffy forecabin with usual grumbling from the crew, and complete equipment, both navigational and mechanical, all go well with this husky hull design. The *TP 224* had her detail plans worked out by James Petrich and D. S. Wood of the yard's own organization and Capt. H. H. Hubbell of the Army Transportation Corps was resident inspector. The hull is 96 x 26 x 9 ft. 7 in. draft forward, overall (10 ft. 6 in. draft aft), and is heavily built of sawn Douglas fir and fir planking, sheathed in ironbark above and below the waterline.

Forward below, is space for 105 fathoms of anchor chain and the Markey Anchor Windlass carrier a reel of 1 inch cable of the same length with two 750 lb. anchors fitted. The windlass is driven by an ingenious arrangement whereby the Fairbanks Morse auxiliary Diesel, through clutch and shafting extending forward and upward from the forward end of the engine room turns the windlass drive, without need of large batteries or motors.

The main power plant, centered in the large engine room amidships, consists of a 450 hp., 6 cylinder crankcase scavenging 2-cycle Fairbanks Morse Diesel turning up full power at 450 rpm. To it is connected a 10 kw. belt driven Bardco generator charging a 56 cell, Philco, 112 volt 175 ampere-hour storage battery and all pumps are built in, including a fresh water cooling system, Viking safety controls, Purolator filters, Weston tachometers and Alnor pyro-



Above: Starboard side of the main F-M Diesel. Switchboard is seen right in this view. Left: American Radiator heating boiler, Goulds hand operated fuel oil transfer pump, and Honan Crane lube oil purifier.

meter. A large Honan Crane lube oil clarifier is fitted and all pumps have Cutler Hammer Controls. A Plainville Electric Master switchboard is fitted to control all circuits on the ship. A Carter salt water pump, driven by a $7\frac{1}{2}$ hp. motor keeps the fresh water cooling system at the proper temperature. Fairbanks Morse fresh and salt water sanitary pumps are fitted and the auxiliary Diesel set consists of a 4 cylinder, 4 cycle Fairbanks Morse unit turning at 1200 rpm. and rated at 40 horsepower. A

G.E. auxiliary generator, Alnor pyrometer, Viking control and a special clutch arrangement for the windlass are fitted to this spring-mounted unit forward in the engine room. An auxiliary Gardner Denver air compressor, driven by a $7\frac{1}{2}$ hp. G.E. motor and a 6-bottle automatically operated CO_2 fire extinguishing system protects the entire engine room.

The TP 224 carries 250 gallons of lube oil, 10,000 gallons of fuel oil and 3500 gallons of fresh

water and her measured net tonnage is 82.

On the main deck, directly back of the windlass, inside the deckhouse, is the first of four double staterooms, one for the engineers, one for the cooks, and two for the crew, all draped neatly around the inside upper engine room area, and accessible from both the deck as well as the inside. A large toilet and shower room is also fitted in this space, and access to the lower engine room and galley is possible from the inside, so the ship can be shut up as tight as a pre-war coffee can in rough weather and nobody needs to get his feet wet on the deck.

Aft of this area is the compact galley and messroom, with large ice box, tile sink, oil fired range and places to sit and slurp coffee and doughnuts as only tugboat crews can do! Aft of this is the 3-sided enclosure around the large Globe towing winch, which is motor operated and has handy controls on the sides.

Atop the main deck is the roomy pilot house with its large hand and pneumatic steering controls, Bludworth direction finder, Islip two way radio, Weston tachometer, full ships Dim-out control for all lighting and inside access to the roomy captain's quarters and a room for 2 mates. A special room for two extra in the crew is fitted aft in the upper deckhouse, while two large lifeboats are carried on the deck at each side. A Gypsy and Windlass is fitted aft to handle the cargo hoist, towing cables, etc.

Liberal use of waterproof plywood is made for the upper structure and inside appointments would grace an ocean liner, with individual wash stands, steam heat, lockers and drawers and comfortable spring beds with reading lamps over each bed.

Skipper of the new tug for the Army Transportation Corps is Captain C. E. Walter, formerly of Olympia, a 15-year veteran of tugboating in the Northwest. On the official trials, the tug ran at 10.42 knots with her engine turning 300 rpm. and made a full circle in 1 minute and 22 seconds and a crash stop in 51 seconds, so you see it will behave beautifully in practical operation.

The TP 224 and her sister tugs of this size, will prove the soundness of the Army's judgment in constructing its huge new auxiliary fleet. And if, after the war, these tugs are for sale, just watch commercial operators line up at the right to plank their money down, for here is exactly what is needed to run the tugboat business when the bells ring.

SOUTH AMERICA'S WATERWAYS VITAL IN POSTWAR DEVELOPMENT

By E. R. LEIPERT*



Powered by a Mack Mariner Diesel, this tunnel-stern towboat plys the Amazon headwaters in Peru.

This towboat of two-foot draft, designed for pushing barges from rubber plantations far up the Amazon, is powered with a pair of Mack Mariner Diesels.

SHALLOW draft boats, powered by lightweight, high speed type marine Diesels are going to play an important part in the opening of vast new resources in South America and hasten that country's industrialization following the war. The continent's inland waterways are going to be her highways into hitherto inaccessible jungle country for the next decade.

The Amazon, Orinoco and Parana-La Plata river systems are destined to become as important in the development of South America as was the Mississippi in the development of our own midwest. Vast tributaries feeding into these river systems will be used to tap what are believed to be the greatest mineral and ore deposits on this hemisphere. Through the use of Diesel propelled boats new sources of copper, nitrates, platinum, diamonds, oil and rubber, to name but a few natural resources, can be exploited.

*Manager Marine engine sales, Mack Trucks, Inc.

The husky, rectangular shaped river boats can push three or four heavily loaded, but extremely shallow draft, barges through water that is but two or three feet deep. These comparatively small boats when equipped with auxiliary fuel tanks are capable of working the river for a month or more without halt for refueling. They thrive on tough jobs, bucking upstream at speeds from three to four miles per hour, and doubling that speed when going downstream with the current.

The boats are powered with Diesel engines since fuel oil is more readily available in South America than gasoline, and the economy of the Diesel engine also allows for greater pay load and less fuel reserves, Mr. Leipert says. The boats as a rule are from 40 to 50 feet long and from 10 to 15 feet wide, and pack a terrific punch in their single or twin Diesel engines.

The use of these boats is also going to help speed the industrialization of South America

and bring about a drastic change in the character of our trade with that continent. As the South American countries increase their own production of consumer goods, they will decrease in importance as a market for our consumer goods. There will be, however, an expanding market for our machinery, machine tools, road-building equipment, boats, trucks, locomotives, motors of all kinds and similar heavy goods.

Almost overnight practically every South American republic has been transformed from a debtor to a creditor nation. In the past three years, as a result of our heavy purchases and curtailed exports, the South American countries have accumulated a most favorable balance of trade. While great changes will take place in practically every country in the world after the war, the greatest changes of all will be made by our South American good neighbors and most of these changes will have their roots in the development of the continent's waterways.

RECENTLY announced, the new Series 50 Diesels are among the latest achievements of the Joshua Hendy Iron Works engineering and manufacturing staffs, whose family of products has included heavy steam marine propulsion units used in World Wars I and II, heavy mining equipment, irrigation and power machinery, during its eighty-eight years of growing up with the West.

This new addition to the Joshua Hendy product family, known as the Series 50 Diesels are basically 4 cycle, 12 in. bore, 15 in. stroke engines with a normal rating of 83.5 hp. per cylinder at 500 rpm.

Many interesting design details are incorporated, such as welded steel base and cylinder block construction, overhead camshaft, unit fuel injectors, dual intake and exhaust valves, Meehanite cylinder heads and optional forged or hollow cast alloy crankshafts.

The cylinder head assembly includes unit type fuel pumps and injectors combined with overhead camshaft with the valves and rockerarms arranged to prevent side thrust on the valve stems in operation. Pump and nozzle units are easily accessible for cleaning.

The dual intake and exhaust valves are alloy steel, operating in removable guides. Large water passages are provided in the heads with dead-water spaces controlled by jet action which directs cooling water to points of highest potential temperatures. Rocker arms bear on slotted cross heads or dividers, which evenly distribute pressure on the valves. Hydraulic tappets are used.

Of steel, ground finished to 3 in. diameter, the camshaft is fitted with forged, case hardened cams, keyed to the shaft. In the reversible engines the camshaft is shifted axially by a pneumatic cylinder.

In the welded steel cylinder block circulating water is confined to the removable cylinder liners by jackets on each liner. Cooling water enters each cylinder jacket from a header and is controlled to give high velocity at the top of the liner before it enters the cylinder head. Coring of the head is arranged to provide jet action around the injector.

Marine versions of the Series 50 Diesels are equipped with reversible-type centrifugal pumps for circulation of fresh and raw water. Tube type heat exchangers are fitted to the engines. Exhaust manifolds are water cooled on both

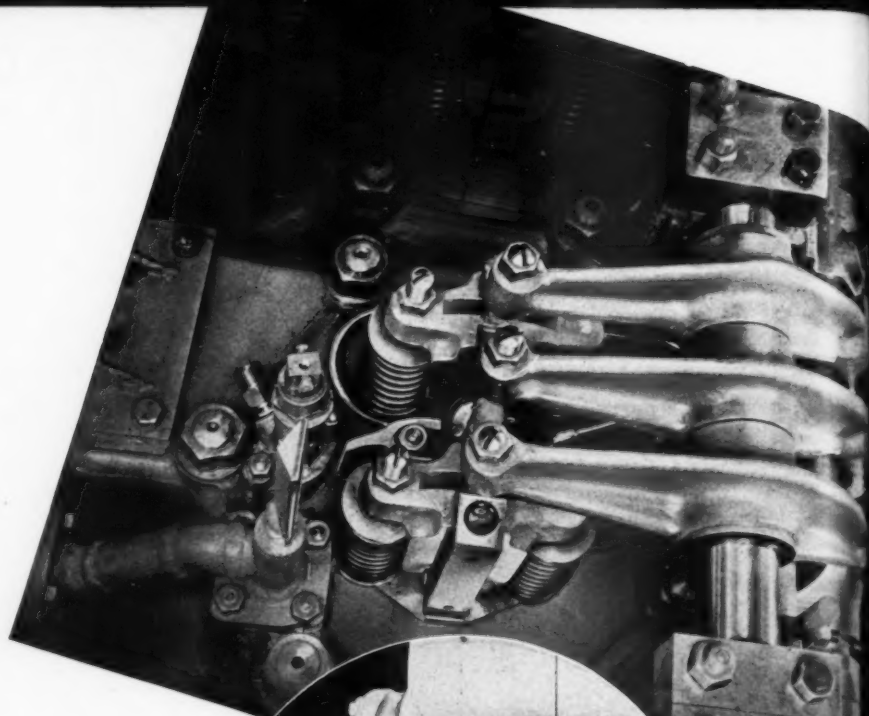
stationary and marine types. The engines are also fitted with pyrometer thermocouples, located at the lower sides of each exhaust outlet, also cylinder-head water thermometers.

The forged steel crankshafts are drilled for forced feed lubrication to connecting-rod and wrist pin bearings and the cast alloy crankshafts are hollow and drilled for the same purpose. Main bearings are centrifugally cast, babbitt-lined steel-backed and are arranged for removal without disturbing the crankshaft. Center main bearing is $6\frac{1}{8}$ in. long, others are $4\frac{1}{8}$ in. long—all 9 in. in diameter.

Between the two main bearings at the flywheel end is the camshaft driving gear. The camshaft chain drive is in two sections, one connecting

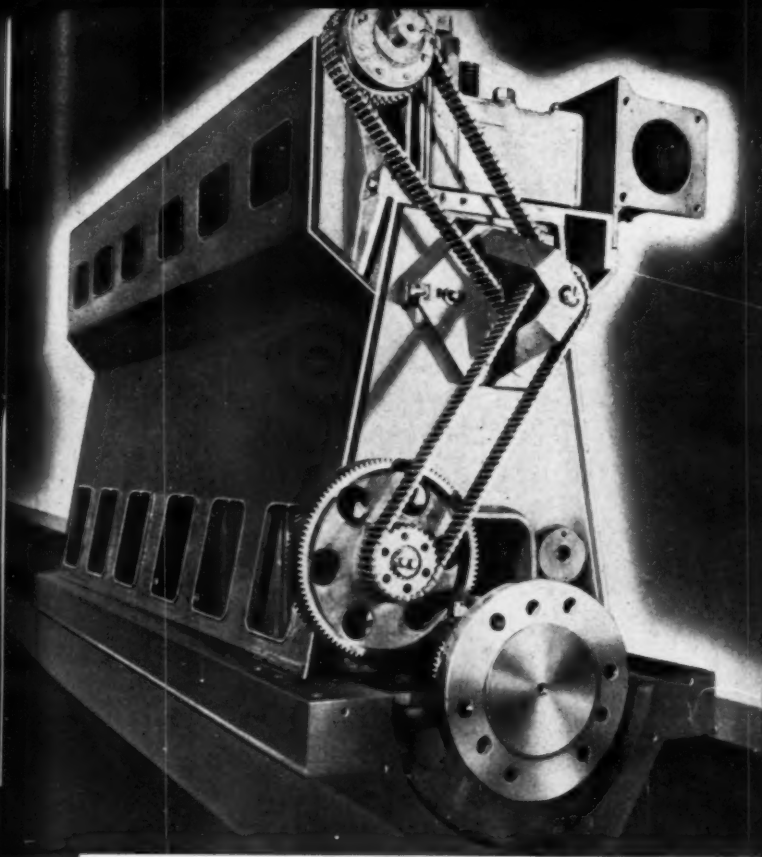
the driving sprocket to the chain adjustment and the other connecting the adjustment assembly to the camshaft.

Pistons are cast Meehanite, oil cooled and fitted with bronze wrist-pin bushings. The forged steel connecting rods are drilled for wrist-pin lubrication and piston cooling. The full pressure lubrication system includes a scavenging pump to remove oil from the crankcase and a separate pressure pump to supply oil to the main and rod bearings and pistons. A friction clutch, suitable for power take-off to 20 per cent of rated power is provided as optional equipment and on marine installations driving through reduction gears, Hendy planetary-type or Farrell-Birmingham continuous tooth single reduction gears are optional.

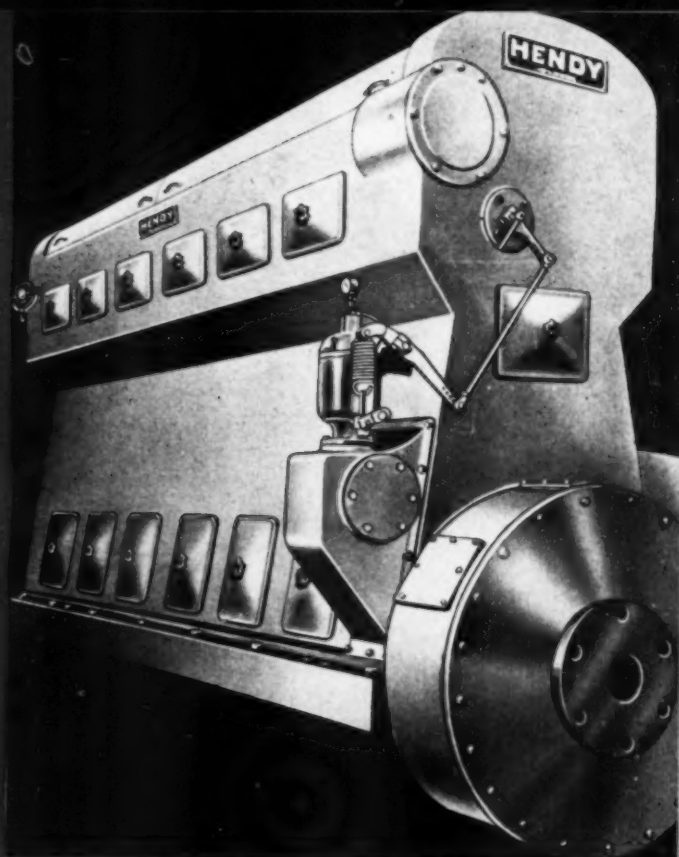


Inset: View of valve mechanism of the new Hendy Series 50 Diesel. Left: Combined starting and timing controls.

A NEW DIESEL BY AN OLD FIRM

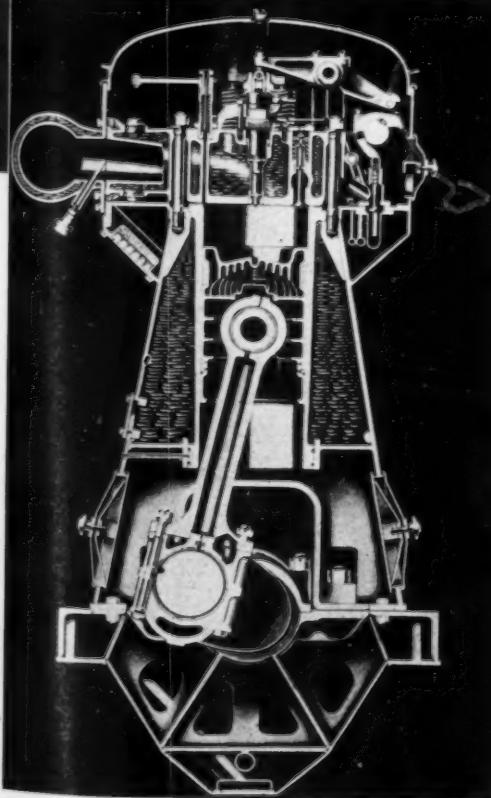


Side view of the Hendy Series 50 Diesel with plate removed showing camshaft chain drive.

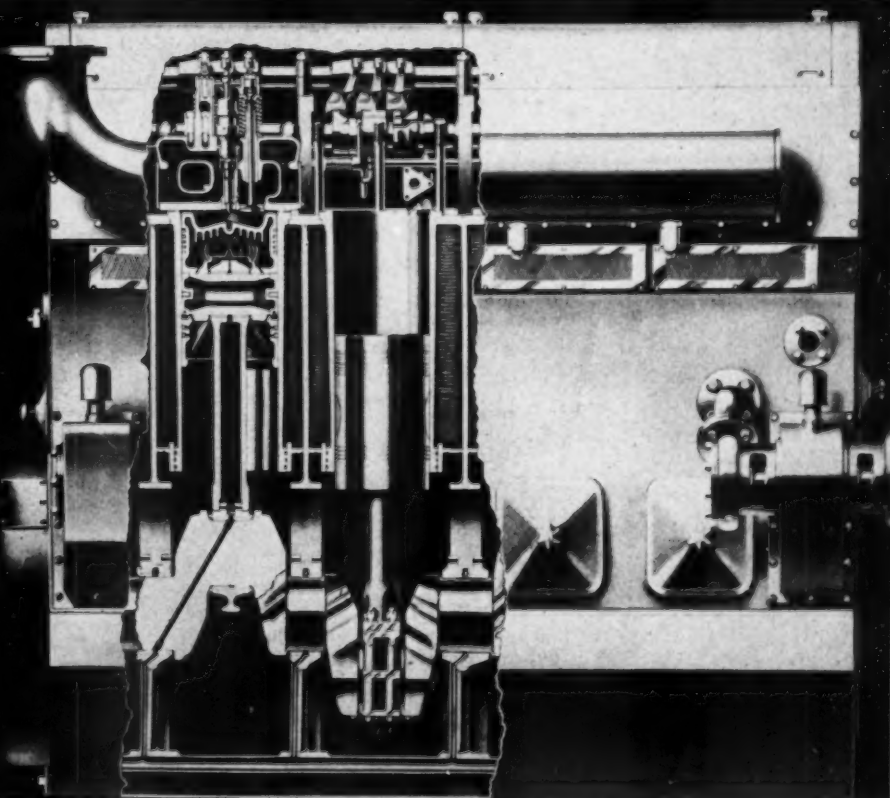


View of the new Hendy Diesel with all inspection plates in place also showing governor and linkage.

Introducing the New Hendy Series 50 Diesel



End cross section showing crankcase construction, valve mechanism and water passages.



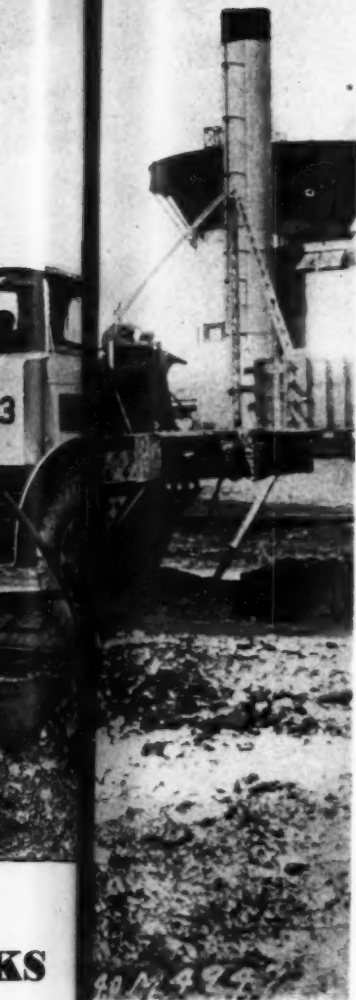
Side cross section showing main bearings, drilled crankshaft, connecting rod passage for wrist pin lube and cooling, also piston and combustion chamber design.

Compare the size of Henry Rowold, Mack vice president, with the giant Diesel truck in the view below. This is a Columbia Iron Mining Co. operation at Cedar City, Utah. The ore being loaded here will be converted to steel in the 180 million dollar mill at Geneva, Utah.

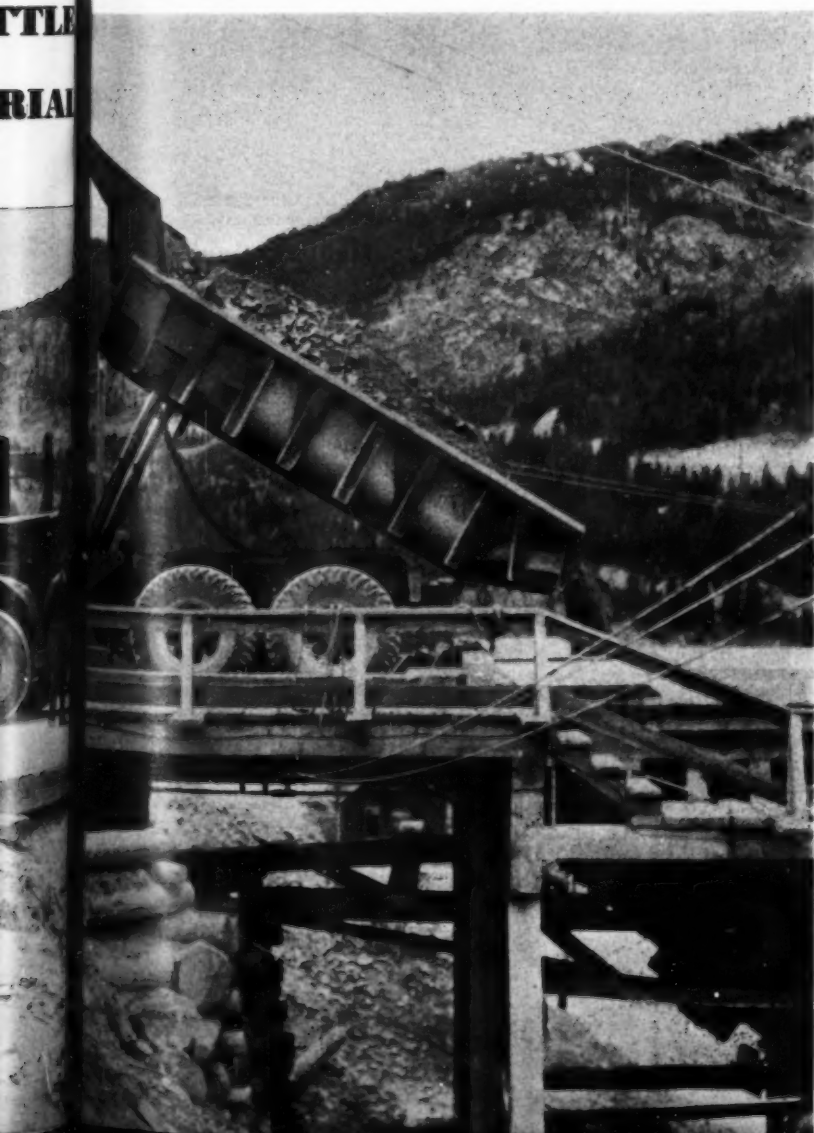


SUPER-TRUCKS HELP WIN BATTLE FOR RAW MATERIAL





This Mack Diesel tractor-trailer unit takes a 50-ton pay load of coal from the Tecumseh Coal Corp. of Southern Indiana open pit mines. The unit weighs a total of 90 tons loaded.



In the view below the huge Mack Diesel truck is dumping a 30-ton load of limestone from the Monarch Quarry of the Colorado Fuel and Iron Co.

THE battle for raw materials, basic ingredient of our tremendous war production, has been won to a great extent by huge 30 and 50-ton super-trucks, mostly Diesels, that speed up open pit operations in North America's vast metal mines, according to H. E. Seanor, vice president of Mack-International Motor Truck Corp. and expert on mine haulage and off-highway truck operation.

The demand for metallic ores, accelerated by wartime necessity, has done much to further the extensive recognition of trucks by mining men who want quick development of the mines on a large scale. In the late 30's a few copper and coal mines made a partial switch to motor trucks. Even though these early trucks were converted highway vehicles and not too well suited to mining requirements, they convinced the operators that a new transportation medium for mine products was available.

Then Mack engineers designed and built 30 and 50-ton capacity specialized mine trucks. Many of these have been in operation for more than 20,000 hours and have hauled millions of tons of ore. During 1943 motor trucks hauled more than 300,000,000 tons of covering earth and ore from the mines. When the complete figures for the year are compiled, Mr. Seanor expects them to show that better than 60 per cent of all the nickel ore produced in America was hauled from open pit mines in these super-Mack trucks. While the year's coal production records are expected to set the total hauled by mine operation trucks at well over 400,000,000 tons of raw coal.

The magnitude of these figures becomes understandable when it is realized that a single 30-ton truck can transport 3,000 tons of ore or coal in a 3-shift 24-hour day on short haul operations. This is equal to sixty 50-ton rail car loads. On one coal mine operation six 50-ton truck-trailers consistently transport 9,000 tons of raw coal in a 7-hour day, with the trucks operating on the coal vein over grades in excess of 10 per cent on a three-mile round trip. This daily haul is equal to 180 50-ton rail car loads.

There is a definite place for railroad haulage in mine operations, the Mack executive points out, especially on long mine hauls from refining plants to market areas or steamship docks. But in production areas where the digging is carried out and on short hauls, trains can not economically compete with trucks. Mines that are now working open pits with rail equipment have no other choice than to wear out their present equipment, however, practically all new operations are being laid out for truck haulage.

Use of rail facilities in open cuts requires the building of right-of-way with attendant vast excavation work, and the laying of ties, rails and switches. Track extension in order to keep pace with the forward moving shovels requires large labor forces. Furthermore, grades in excess of three per cent are not favored by rails, whereas trucks operate over eight to ten per cent grades with ease, reducing road construction as much as 400 per cent. Then too, the trucks are not rigidly confined and thus build their own roads over the shortest route out of the pits.

The economic limit a truck can haul mine products, according to Mr. Seanor, depends on many factors. However, some ores, such as vanadium, are hauled as far as 160 miles to processing plants by truck. Iron, copper, lead, bauxite, titanium and many other mine products are not generally hauled more than from two to four miles. In large open pit coal mines the hauls rarely exceed four miles.

FOUND! 270 extra gross ton



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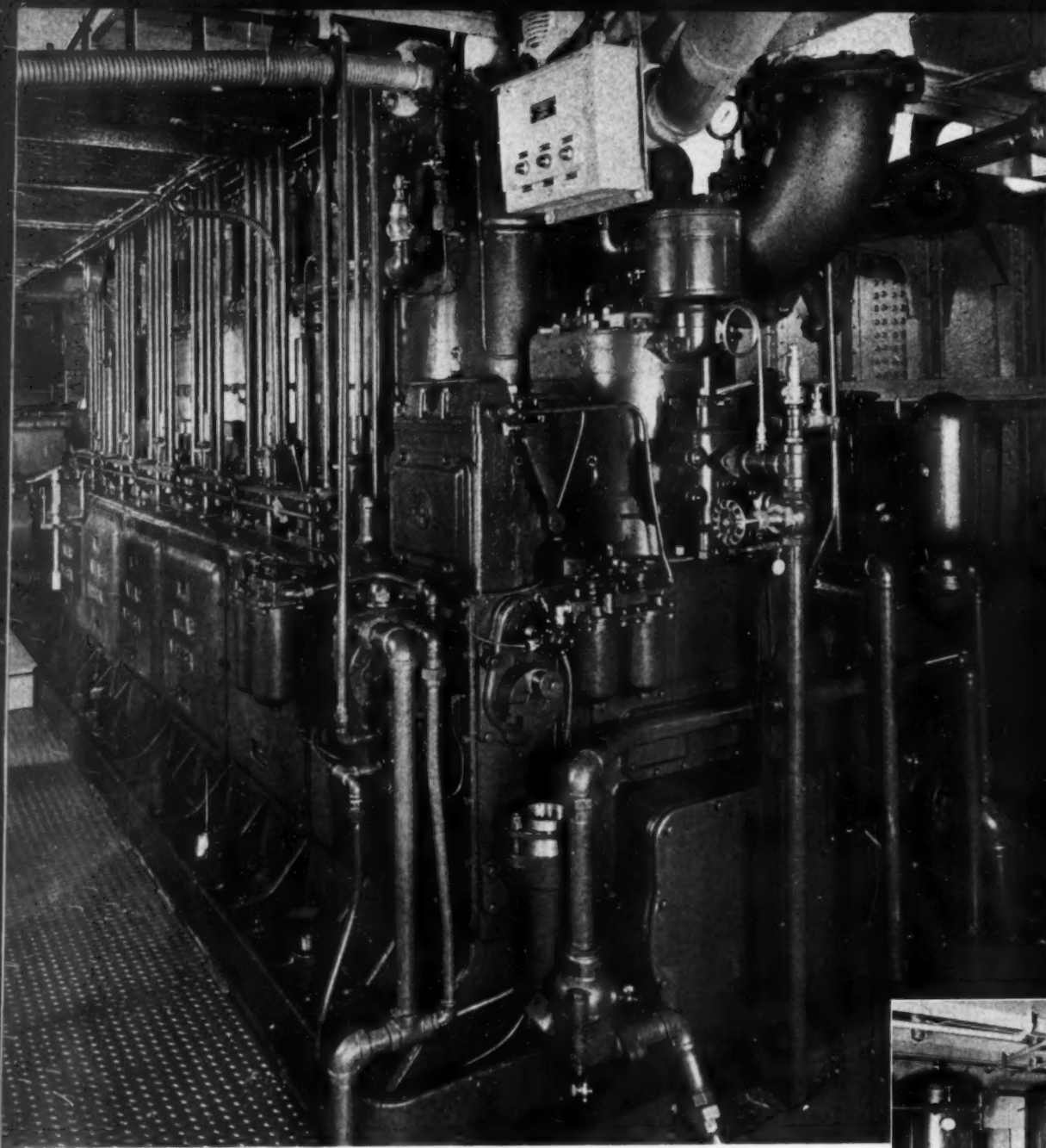
sions

KEEP AMERICA STRONG
BUY MORE WAR BONDS

27,000 cu. ft. more cargo space—1½ knots more speed—more trips per year—great fuel economy! • That's the story of the United Fruit Company's S. S. La Playa since she was converted to GM Diesel power. • It's the same story of dependable, economical, easily maintained power that has been written by thousands of Army, Navy, Coast Guard and commercial vessels which are using GM Diesel power.



ENGINES 100 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland, O.
ENGINES 10 to 450 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.
LOCOMOTIVES 1000 to 5000 H.P. ELECTRO MOTIVE DIVISION, La Crosse, Wis.



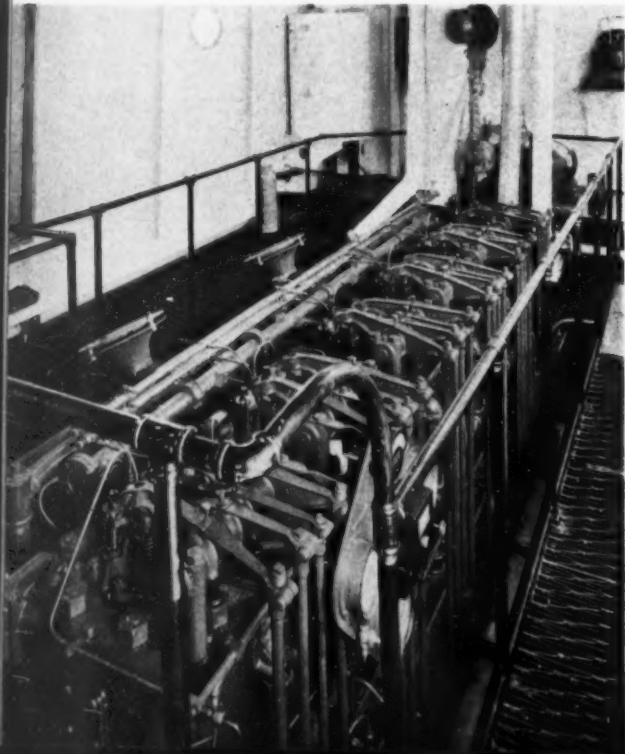
Forward end view of the Atlas-Imperial, 600 hp. main Diesel selected to repower the 55-year-old "Duke." Note Purolator fuel and lube filters, center and Brown automatic alarm panel, top.



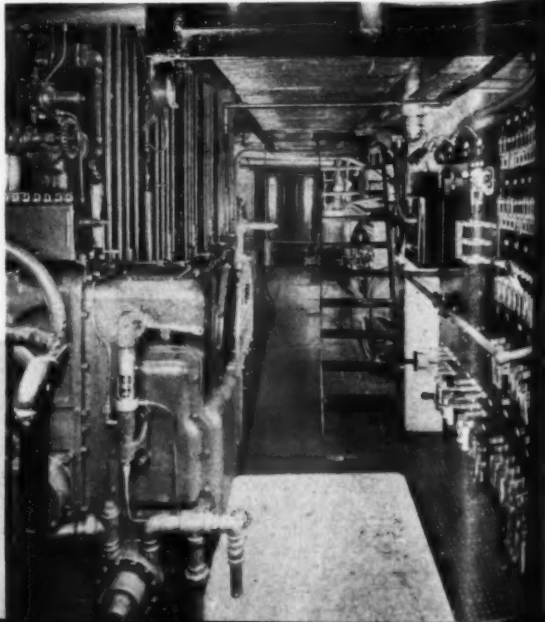
The "Duke" on trial run in Baltimore Harbor after conversion to Diesel in December 1943.



Right: Compressed air receivers, heating boiler, and Briggs oil clarifier are easily accessible.



Left: View in the upper engine room grating showing cylinder heads and valve mechanisms of the Atlas-Imperial main engine.



Aft end of the main Diesel with switchboard showing right and one of the two Cummins Diesel auxiliary generating units mounted on Korfund vibro-dampers showing through the ladder.

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DIESEL RESCUES FINE OLD IRON HULL FROM SCRAP PILE

By WILL H. FULLERTON

IT IS not often it pays to spend \$100,000.00 rejuvenating an old tugboat hull but the converted B. & O. tug *A. C. Rose*, renamed *Duke*, has proved an exception to this rule. She was built in 1888 at Philadelphia for the Baltimore & Ohio Railroad Co., as solid a charcoal iron tugboat hull as they came. In the course of the years her 380 hp. steam plant pulled and pushed many a car-float and box scow but it was no mere coincidence that when Robert B. Wathen spotted the tug in 1942 he realized that here was a hull that was worth a better fate than to be broken up for scrap. He acquired the tug from her owners and proceeded to have the Patapsco Dry Dock Co. which he operates, at the South End of Andre Street, Baltimore, Md., clean her out for a brand new Diesel installation. An Atlas-Imperial Diesel engine was ordered for delivery in February, 1943, but the war demanded prior lien on Atlas engines, and it was not until July, 1943, that the engine builders were able to comply with the authorization of the Director of Industry Operations and effect delivery of the engine. The installation was finally completed in December and after successful dock and harbor trials the tug is again in essential service.

The *Duke* is owned and operated by the Diesel Tug Wathen Corporation, a subsidiary of Wathen & Co., and measures 100' x 22' x 9.6'. After having been placed in drydock her charcoal iron hull was drilled and all thin plates replaced so that her hull now has the original thickness. She is completely new from her deck beams up, including an entirely new deck, waist, guards, main and pilot house, giving her a distinctive and modern appearance. New tail and intermediate shafts were installed, in fact only the hull remains of the original tug. Her equipment is complete and enables the tug to take on any kind of a job whether long distance towing or harbor work.

The main engine is a six cylinder 15 x 19 in.

Atlas-Imperial four cycle, direct reversible Diesel developing 600 hp. at 300 rpm. It operates with a common rail high pressure fuel injection system with a full load fuel pressure of approximately 4,500 lbs. per square inch. On the trial run, operating light, an exhaust temperature of 575°F. was developed at 300 rpm. indicating a load temperature of approximately 730°F. when towing. When running light a speed of 12¼ knots was attained at 575°F. exhaust and turning a four bladed Ferguson propeller. Vibration is conspicuously absent when running either light or when towing.

There are two four cylinder 4½ x 6" Cummins auxiliary Diesel engines in the engine room each direct connected to a 25 kw. 1200 rpm. Crocker-Wheeler 125 volt d.c. generator and these auxiliary units are mounted on Korfund Vibro-Dampers to prevent the transmission of vibration.

A 20 kw., variable speed, 125 volt d.c. General Electric generator is driven by "V" belts from the tailshaft and to complete the electric system a 56 cell 110 volt Prest-O-Lite heavy duty marine type storage battery is floated on the line. The switchboard built by the Wolfe & Mann Manufacturing Co., Baltimore, Md., has a Hartmann reverse current relay and a Safety Car Heating & Lighting Co. lamp voltage regulator.

Alnor exhaust pyrometer and Weston electrical tachometer are installed on the main engine with dials on the engine gauge board for convenient reading. Weston thermometers indicate the operating temperatures of lubricating oil and cooling water.

The fresh water cooling system consists of a heat exchanger furnished by the Ross Heater & Manufacturing Co., with a 3½" raw water pump supplied by the Weinman Pump Co., of all bronze, reversible type "V" belt driven from the tailshaft and the bronze fitted fresh water pump built-in on the main engine of the double act-

ing reciprocating type driven by an eccentric at forward end. The fresh water cooling system circulates through a separate tank of approximately 200 gal. capacity. The tug has a total fuel oil bunker capacity of 15,000 gallons and lubricating oil storage tank for 400 gallons. A Brown automatic alarm system built by the Fleck Engineering Co. safeguards the engine against failure of the lubricating oil pressure or excessive temperature rise of cooling water. An auxiliary Worthington, V type 63 cfm. 800 rpm. 15 hp., GE 115 volt d.c. motor driven compressor supplements the built-in 48 cfm 300 rpm. two stage compressor on the main engine insuring an adequate supply of maneuvering air at all times.

There is a 2½" electric motor driven Yale & Towne bilge and fire pump and a 2" pump of the same make for general service. The Dayton Pump Co. furnished the automatic pumps for the fresh and salt water services onboard including galley, staterooms, showers and toilets.

Maxim spark arresting exhaust silencers for main and auxiliary engines were installed in the stack. The Briggs Clarifier Co. furnished the continuous oil filtering equipment for both fuel and lube. Pennsylvania Flexible Metallic Tubing Co. supplied the exhaust hose for main and auxiliary engines.

R.C.A. ship-to-shore telephone equipment and direction finder are installed. The oilburning heating plant and galley stove were furnished by Preferred Utilities Co., and four unit heaters with fans in engine room by Crane Co. Link-Belt Co. supplied the Hawser Capstan.

After several weeks of service at this writing, many tow movements have been made between Baltimore, Norfolk, and New York and that the performance of the *Duke* is going to write an attractive chapter in the business history of her owners seems assured.



DIESELIZED RICE FARMER FOOD CHAMP

By

F. HAL HIGGINS

CALIFORNIA rice farmers are setting the world's pace in economical food production under war conditions, your Old Reporter finds after a series of drives that took him through 3,000 miles of harvest fields last fall. He saw rice growers, millers, USDA and University of California engineers and plant breeders, dealers and manufacturers. The outstanding fact is that the California rice farmer was ready with his Diesel tractors, combined harvesters and driers when war broke out and he was asked to produce more with less manpower and machinery.

The California Field Crop Report for Nov. 1 last year, sets the California yield at 12,155,000 bushels from 221,000 acres. With weather almost perfect, losses from rains were practically at the zero mark. Only wild fowl, mostly ducks, caused losses. This is an all-time high for

the state that began growing rice scarcely thirty years ago and was expected to drop it as soon as World War I ended and prices dropped back to world competition. But the California farmers began figuring how to mechanize the crop to handle it as they were doing small grains like wheat and barley. The writer recalls the first direct combining tested out by Caterpillar engineers in 1927. Fred Lewis, now an engineer with Harris Manufacturing Co., was in charge of this first combining experiment with rice. It worked, but the rice "checked" under the heat of the sun as the swath lay on the stubble in the hot sun. Hence, the dehydrator, or drier, was brought in from Italy that same year to start a teaming up with tractors and combines to give the perfect answer. With the arrival of the first Diesel tractors in 1931, the rice farmers of the Sacramento Valley immediately began buying them.



Harvesting rice, October 1943, on Dettling's ranch with a pair of Caterpillar Diesel tractors and special Combines.



On this 1943 harvest trip, the writer found growers with as many as 14 Diesel tractors pulling combines, bulldozing down irrigation checks, pulling trailers on tracks to get the rice from the combine bulk bins to the highway, and unloading these field trailers by take-off power that unloads by screw conveyor and other means.

George Lodi, with 950 acres east of Arbutle, was seen on the job at his shop and out in the rice fields where his giant home-built Caterpillar-pulled rice special combine was at work. "I've always been buying track-type tractors from the time they were put on the market, it seems," said Mr. Lodi. "When the Diesel came along that made the big cut in operating costs that put a lot of us farmers back on our feet. I would use more if I could get them. In fact, I would have Diesels on the combines back of the tractors to power the machines if we could get them." Mr. Lodi is one of the key rice growers and leaders in the Colusa county area. He is on the Wild Waterfowl Committee, as well as in many other farmer organizations.

Down near Knights Landing are the Dettling Brothers—Steve and Frank—who have literally lifted themselves from obscurity to a top place in rice farming with their Diesel tractors. War found them ready, and this year they are right up in the top ranks with two big special rice combines pulled by Caterpillar Diesels, plus another Diesel on a bulldozer to knock down irri-

gation checks for roads through the fields at harvest time. "We could use still one more Diesel tractor if the Government would let us have it," said Steve as he drove through the rice to show his rice harvesting equipment. His latest rice special combine he built in his own shop at a cost of about \$12,000 for this harvest, and he thinks it is just about the perfect machine.

He would have it powered by a Diesel engine mounted on the machine to do the threshing could he have got one. A fourth Caterpillar Diesel hauls his special rear-dump trailer on tracks. This is powered from the Diesel tractor engine, raising the front of the body to empty into trucks at field's edge via screw conveyor in the rear end. No matter how wet the field, these track-type machines—combines, tractors and trailers—can negotiate the fields.

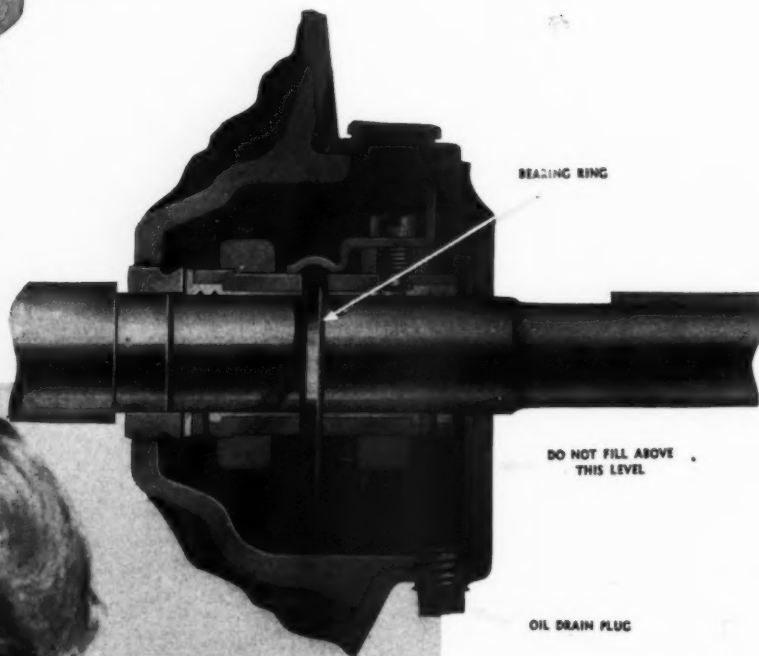
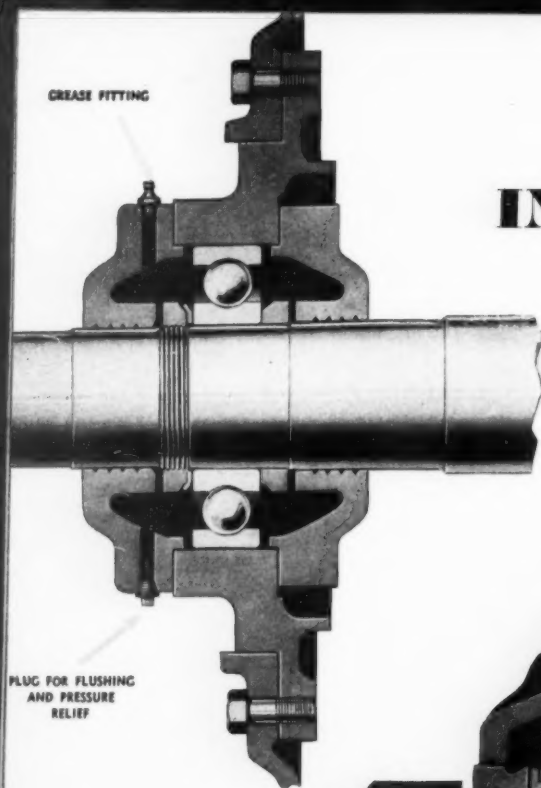
Down on the Patterson Ranch, on the West Side of the San Joaquin Valley, the writer saw a pair of Allis-Chalmers HD7s with General Motors Diesel engines doing this job of taking the rice from bulk combines to the portable bins outside, where trucks again transferred the rice for hauling to the drier. Again, in the Imperial Valley, Prof. Mackie, trouble-shooter for the Imperial Rice mills, took the writer out to see the rice harvest. Here the Diesel tractor was performing its job perfectly, though there was some argument as to which combine was doing the better work. This area is Ben Hulse's former dealership.

So, while we can salute the California rice farmer as the world's champ at wartime food production, and plant breeder, airplane, soil, climate, fertilizer and drier get their acclaim, it is the Diesel tractor that took it to the heights and had its farmers ready for war. That Diesel-equipped farmer is plenty smart; but he has a dealer back of him who serviced the Diesels and kept them going when new ones couldn't be had. "Earnie" Hull, Weaver Tractor Co., branch manager at Woodland, is in charge of the finest service station in the world, just erected with more than thirty men working in it. Dan Beattie at Marysville is another Diesel sales and service stalwart who is doing his job to keep the Diesels Dieseling for more rice farming with less men. It's a great team—and a winning one!

Who said we cannot get along without Jap farmers on the west coast. Give us a few more Lodis, Dettlings and Pattersons with enough Diesel tractors to keep their ingenious machines going and this country will have all the alien-free rice it needs.

INSPECTION and MAINTENANCE

By R. N. TOMB*



Upper left: Typical grease-lubricated ball bearing for D-C motor. Shaded vertical section along shaft.

Above: Typical oil ring-lubricate sleeve bearing for D-C motor. Shaded vertical section along shaft.

PRIOR to the all-important trial run of any Diesel vessel, each electrical auxiliary application must be checked thoroughly. The problem is "What should be checked and how should it be done?" There are probably as many ways to accomplish this purpose as there are to build a fire. Nevertheless, here in brief seems to be a logical order to follow in doing the job.

The driving unit, which is usually more closely associated with the application than its control, should receive first consideration.

Before applying power to the motor:

1. Remove all dust, dirt, grease, moisture and excess paint from the exterior of the motor. Compare the motor nameplate with the assembly drawing.
2. Check for chipped surfaces, broken mounting feet, obvious misalignment, loose coupling nuts, missing protective shields, and any loose rags or metallic chips.
3. Inspect all bearing housings for possible foreign material, such as dirt, chips, etc. (Fig. 1 and 2). If in doubt as to the bearing cleanliness or quality of grease, remove the grease drain plugs and flush the bearing with a light oil. Always replace the plug and refill the bearing to the proper level.
4. Never "over oil" the motor. Oil splashed over the insulation will lead eventually to as much trouble as tossing in metallic chips.

* Federal & Marine Divisions, General Electric Company.

Generator brushes being sanded to good fit with commutator, an essential operation when new brushes are installed.

Graphite brush in D-C motor being inspected to see whether it is chipped or cracked.

SHIPBOARD ELECTRICAL AUXILIARIES

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Likewise, too much grease in the bearings will cause them to run hot.

5. Check the motor conduit box for loose or extra wires, nuts, washers, or other misplaced metallic objects.
6. Obtain a source of dry, compressed air, and blow out the inside of the motor. Be very careful that no moisture is present. If possible a vacuum arrangement should be used. A strong blast of compressed air may injure the insulation if held near to it.
7. If a d-c motor, check the position of brushes against the manufacturer's setting on the stator frame and against the pin pricks on the commutator itself, if this system is used. Inspect the brushes to see that they are not chipped or cracked and that they are properly seated (Fig. 3). Fine sandpaper can be held between the commutator and the brush with the rough side towards the brush, and the motor rotor rocked back and forth until the brush tip assumes the round contour of the commutator. The contact between the brush and the commutator has an important influence on the performance of the motor.
8. Inspect the commutator surface for cleanliness. (Fig. 4) Sandpaper is very satisfactory for removing grease, oil, or paint. Do not use steel wool, emery paper, or carbon tetrachloride.

If the motor is grease lubricated and equipped with a pressure relief fitting, free the relief hole of any hardened grease. Add new grease with a hand operated grease gun until grease appears at the relief hole or at the inner end of the grease relief tube. (Relief tubes are most commonly used on the fan end of fan cooled motors. These tubes are analogous to measuring sticks—thereby eliminating the necessity of removing the protective fan cover during greasing). Several times during the greasing process, remove this tube and inspect the shaft end. When grease appears at this inner end, sufficient grease has been added. After the new grease appears at either of the indicated spots, run the motor for 15 or 20 minutes or until all of the excess grease has been worked out of the relief hole or into the relief tube. After this period, stop the motor and wipe off or clean out the excess grease. Replacing the relief plug completes the greasing operation.

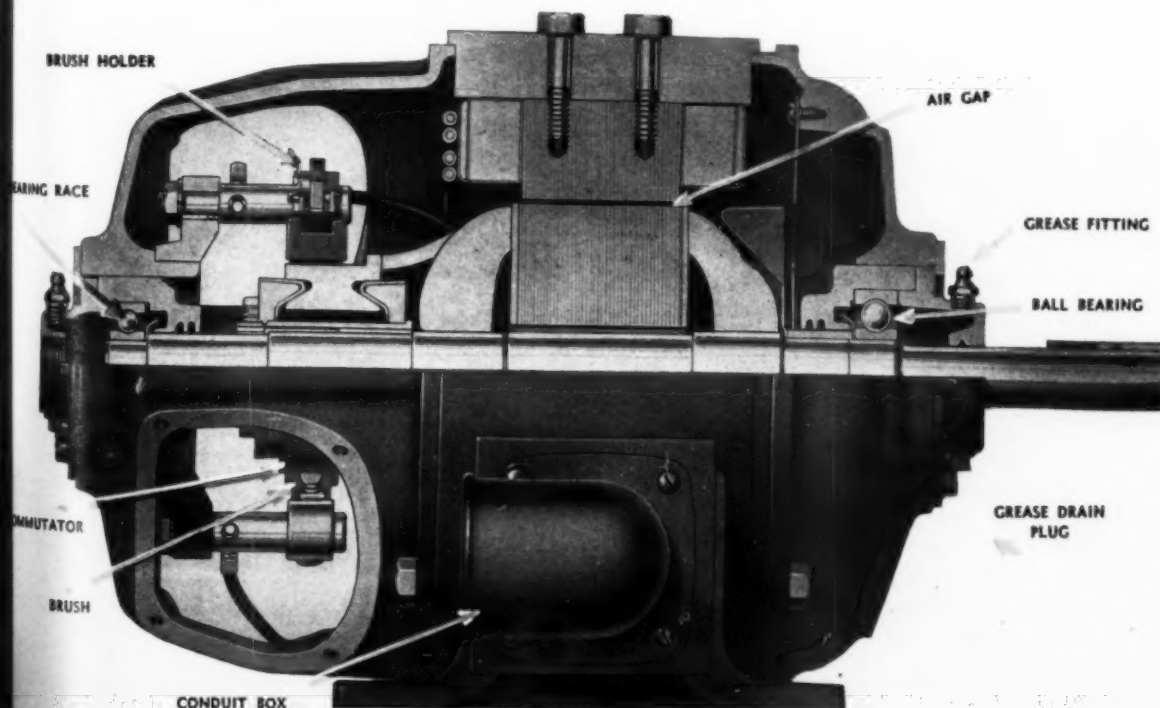
If the unit is a sleeve bearing motor, re-lubricate as outlined above, but be certain to check the bearing rings for freeness.

9. Compare the direction of rotation name-plate with the assembly drawing. A great deal of trouble can be averted if small items such as this are thoroughly checked.

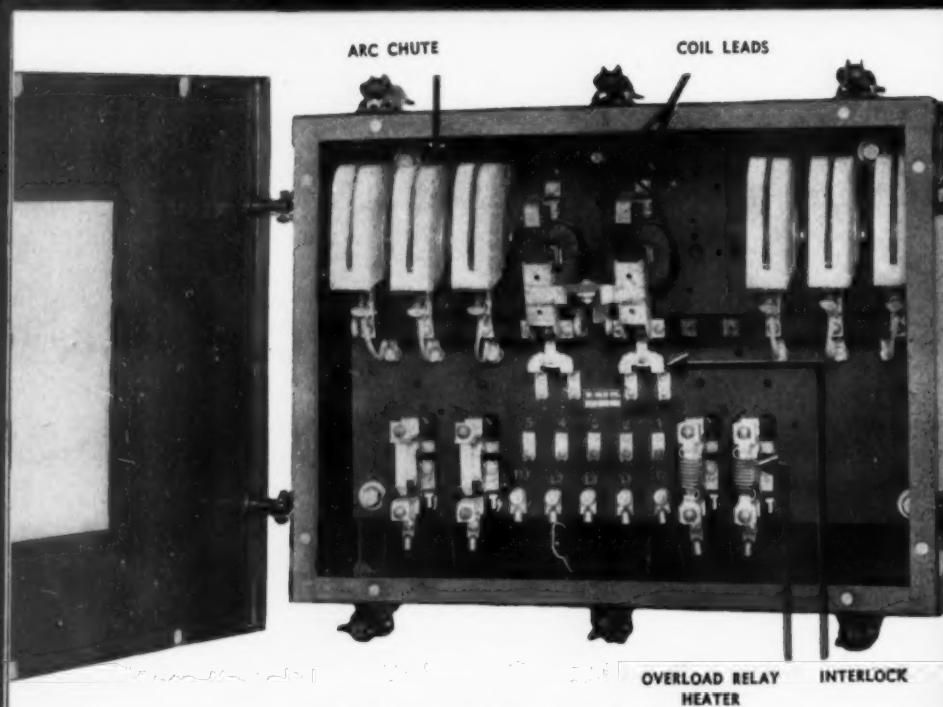
10. Before placing load on the motor for the first time, it is desirable to operate for about one hour to test for any unusual localized heating of the bearings or windings.

In the same manner, a logical routine can greatly simplify the periodic inspection and cleaning of these motors. Periodic checks should be made at the end of each voyage or during each voyage, depending upon the application and whether or not it can be inspected or cleaned without interrupting the normal operation of the auxiliary. Many operating engineers keep accurate records of pertinent data on the performance of each application. A card file system can be adopted to record the location, general appearance, work required, cost of repair, instrument readings, date of inspection, etc. of each motor. In order to supply data for these records, the periodic inspection or cleaning technique of these motors can be handled as follows.

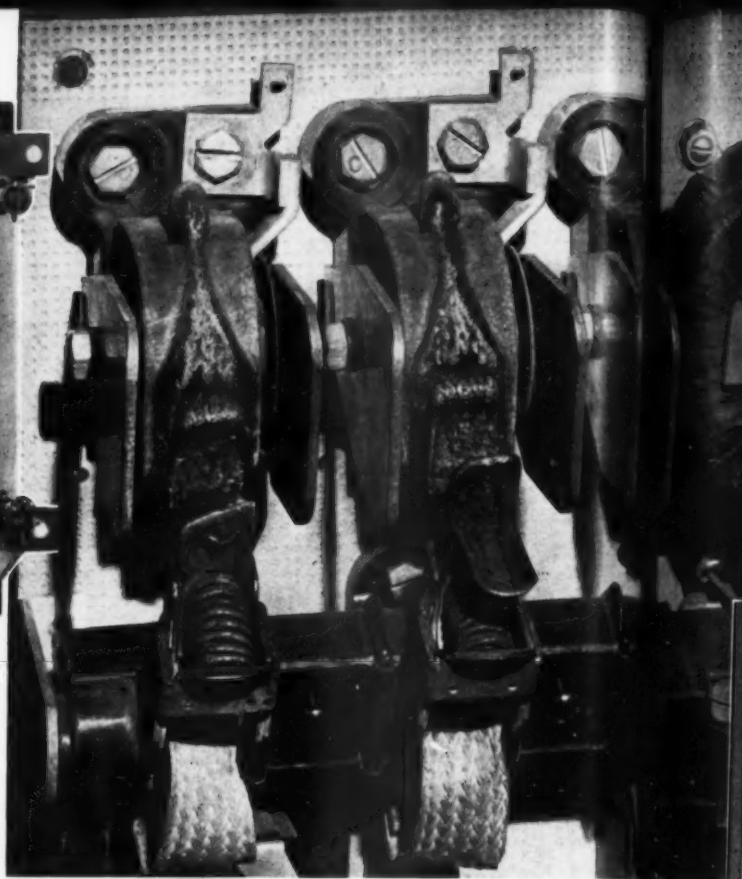
1. Motor bearings, and bearing settling chambers (Fig. 5) should be checked for dirt and oil sludge. To clean these, remove the drain plugs and drain out the oil, which will carry away most of the impurities. In extreme cases, the housings can be flushed with carbon tetrachloride. New lubrication should be handled as previously explained. Seal the



Open ball-bearing D-C motor. Pictorial longitudinal semisection.



Interior of motor control panel.



Front view showing result of failure to replace parts. Spring at left has lost tension as a result of overheating from undervoltage and improper contact pressure.

drain plugs with a compound such as white lead. Waste packing in bearings of small motors should be renewed, if necessary, or at least unmatted.

2. Check commutators, collector rings, brushes and brush riggings for carbon or copper dust. If these are inspected frequently, they should require only a thorough wiping with a piece of canvas or non-linty cloth. These parts are the most vulnerable spots on the motor, and must be carefully watched. Be certain that all brushes are in good condition and do not require replacing. The brushholder springs can also be inspected when checking the brushes.
3. Investigate all lead wires and especially the shunt connections between brushes and brushholders, for proper tightness or contact.
4. Periodic inspection should be made to determine the condition of the motor windings. If any trace of moisture, oil, or dirt is found, the windings should be cleaned immediately and necessary steps taken to prevent recurrence.
5. Prior to cleaning windings or other parts of the motors, it is advisable to remove dry, loose dust. A vacuum arrangement is much preferable to an air blower. Heavy layers of dirt or grease should be scraped off with a wooden or plastic stick. Never use a metallic scraper. Should it be necessary to "wash down" the insulation, use carbon tetrachloride, not soap and water, but be careful to allow plenty of ventilation to avoid toxic effects. Most manufacturers recommend that this solvent be ap-

plied by air under pressure. The atomizer should be held close to the windings so as to obtain the greatest benefit from the fluid.

6. All rusted iron parts, collector ring insulation, commutator clamping ring insulation, or windings whose protective coatings have been damaged, should be cleaned thoroughly with carbon tetrachloride and then varnished. A high grade insulating varnish should be used. It is absolutely essential that the windings are thoroughly dry before applying this coating. This can be facilitated by baking the motor in an oven (temperature not to exceed 90 C.) or by making a canvas enclosure for the motor with a hole at the top to permit moisture to escape, and then inserting heating units or lamps to heat the air within the enclosure. Most motor troubles are in themselves very minor, but when allowed to accumulate will cause no end of worry. Motor life depends chiefly upon cleanliness, good insulation (lack of moisture), and proper lubrication.

Contrary to some opinions, electrical control must also receive careful periodic check-ups. Devices which play a vital role in the proper functioning of auxiliaries, most certainly cannot be ignored. Inspection and maintenance of controls will pay big dividends in preventing costly shutdowns and lost motion.

Fortunately, the manufacturers of electrical control have inherently designed most controls whereby check-ups can easily be accomplished.

This does not imply that inspection routines can be taken lightly, but is intended to abolish an old fear that motor control panels and auxiliary electrical equipments are something from another world and are too complicated to handle or inspect. Many manufacturers supply specific maintenance or reassembling information for these devices. The main thing to remember is that inspection of shipboard auxiliary controls must be a continuous process, and must be competently handled. Following is a suggested routine.

Before applying power to the control:

1. Thoroughly familiarize yourself with the circuit and operation of each new controller. (Fig. 6)
2. Remove all dust, dirt, grease, loose nuts, bolts or washers from within the enclosure. Obtain a source of compressed air and blow out the inside of each enclosing case. Again a vacuum arrangement is preferable. Clean all contact making parts with carbon tetrachloride, again being sure to provide good ventilation to avoid toxic effects.
3. Tighten mounting bolts, arc chutes, terminal connectors, etc. However, do not tamper with set screws, springs, interlocks, overload settings, mechanical stops, etc., without being thoroughly familiar with the device.

To be concluded next month

WHAT THEY SAY ABOUT THE GAS-TURBINE

By WILBUR W. YOUNG

ABOUT the middle of last year, I visited Dr. Charles E. Lucke, head of Pupin Physics Laboratory, Columbia University and asked him to think out loud for me about the Gas-Turbine. This, Dr. Lucke graciously consented to do, and he gave freely of his long experience in both the academic and practical consideration of prime movers in general and internal combustion machines in particular. Given Dr. Lucke's consent to quote him, I set down his thoughts on the Gas-Turbine as faithfully as I could from hastily jotted notes and memory with the idea of passing them along to the readers of DIESEL PROGRESS at an opportune time. On December 1st, six months after my talk with Dr. Lucke, a paper entitled "Gas Turbines and Turbosuperchargers" was delivered by its author, Dr. Sanford A. Moss at the annual meeting of the American Society of Mechanical

Engineers in New York. Widely known as the inventor of the turbosupercharger, Dr. Moss is consulting engineer for the Supercharger Engineering Division of General Electric Co., West Lynn, Mass.

There are striking parallels in the expressions of these two eminent authorities which clearly outline the status quo of the Gas-Turbine. I use the phrase advisedly because there is ample evidence that many academic problems are nearing solution in the experimental and manufacturing fields. Let us see, however, where the Gas-Turbine stands and where its further development leads. Please bear in mind that in the following material Dr. Moss' expressions are quoted direct from his paper—whereas Dr. Lucke's opinions are given indirectly.

Dr. Moss

Competitive Position

THE gas turbine as an efficient prime mover is not yet here, but operating results of thousands of turbosuperchargers on American airplanes are paving the way to the higher temperatures needed for its development. However, whether the gas turbine will be able to compete with other types of prime movers when it arrives is a matter of speculation only, Dr. Moss said.

Temperature Limitations

"The long-sought gas-turbine prime mover, with temperatures much beyond the 1000 F now in use, seems to be getting nearer," Dr. Moss stated in speaking of the likely results from operating studies of turbosuperchargers in war use. "Of course, this same progress is paving the way to higher temperatures and higher efficiencies for the regular steam cycle and two-fluid cycles. So we can only speculate as to whether the gas turbine with its compressor, combustion chamber, and heat interchanger is going to compete with the other cycles which instead have economizers, feedwater, heaters, feed and air pumps, boilers and condensers."

Aviation

The aviation turbosupercharger, a type of gas turbine in itself, originated as a by-product of gas-turbine prime mover development which it is now accelerating, Dr. Moss said. "It is true that the aviation turbosupercharger has only short-time operation at extreme conditions and does not have to meet the conditions of continuous operation in a power plant. Nevertheless, many problems have been solved, due to the impetus of World War II, which advance the prospects of a gas turbine as a prime mover," he stated. Quoting reports of operations of turbosuperchargers in war which show that they are subject to conditions far exceeding their test rating, Dr. Moss pointed out that the average of these conditions bears a relationship to the long-time operation at sea level which a gas-turbine prime mover would be subjected. And now please turn to page 90

Dr. Lucke

Competitive Position

ALL development of the gas turbine to date is centered around the reaction type of turbine which is just not feasible in capacities under 2,000 hp. Dr. Lucke pointed out that it is not necessary to adhere to the reaction type turbine nor the axial flow compressor both of which have definite limitations particularly in working down to smaller sizes. He feels that, before the gas turbine becomes a practical and available machine in the highly competitive horsepower brackets, someone will have to develop a highly efficient impulse type turbine combined with other than an axial flow compressor.

Temperature Limitations

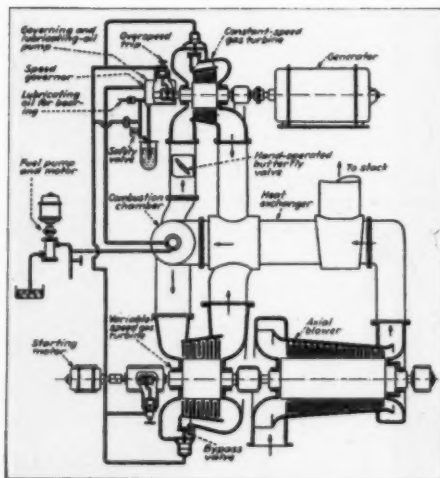
One of its present limitations is the need of an alloy capable of withstanding temperatures up to 1500°F. and Dr. Lucke pointed out that, when the metallurgists give us such an alloy, it will, at the same time, become available for use in steam turbines thereby promoting the use of higher pressures and super heat with resultant higher efficiencies.

Aviation

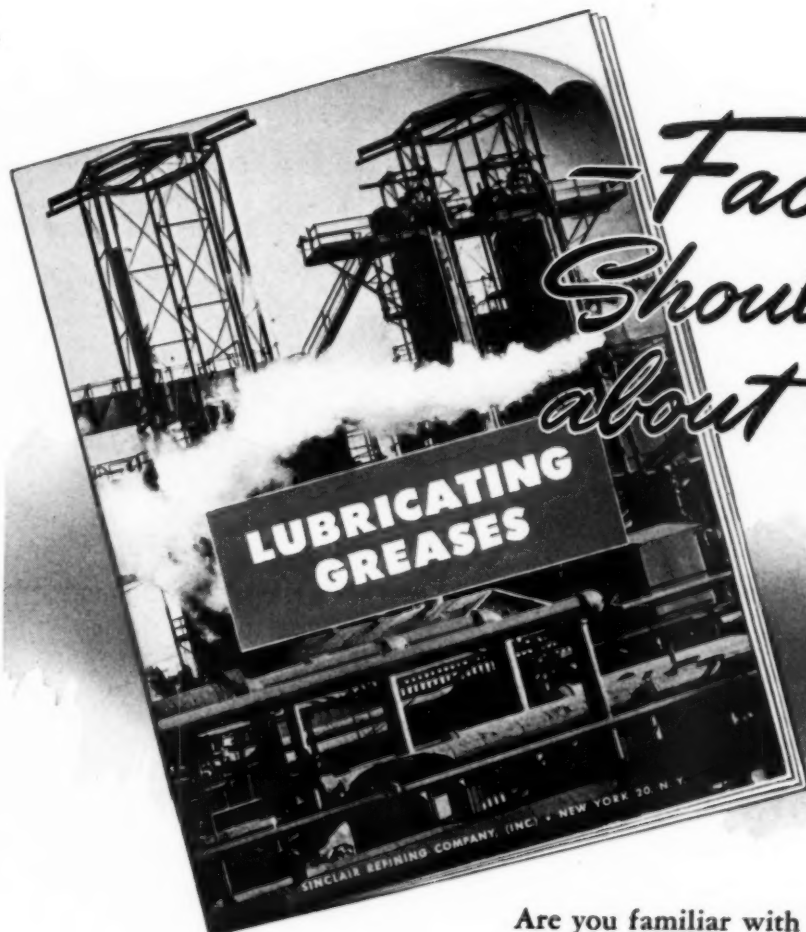
Dr. Lucke does not share the enthusiasm of many over the future of the gas turbine in aviation. In other words, if a 2,000 hp. unit is the smallest practical unit that can be built then its weight and size per horsepower would be prohibitive for aircraft use. He feels, however, that the gas turbine is essentially a commercial machine today and that its future in some modification of its present form is definitely assured. In certain limited fields, its use may be extended both upward and downward only with basic design changes, which may or may not come.

Further Limitations

Dr. Lucke sees no advantage in the gas turbine's ability to operate without water. He pointed out installations of Diesel engines using fuel oil for jacket cooling and said that it is entirely feasible to operate a Diesel engine



Schematic arrangement of a two-shaft gas turbine. One gas-turbine drives the compressor, the other a generator.



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BETTER DIESELS



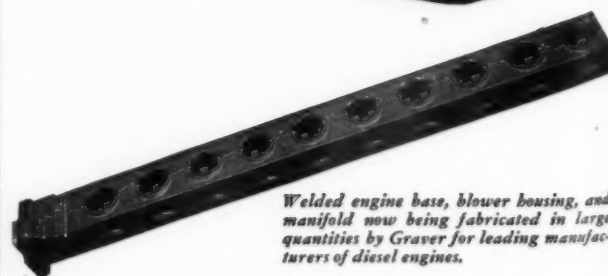
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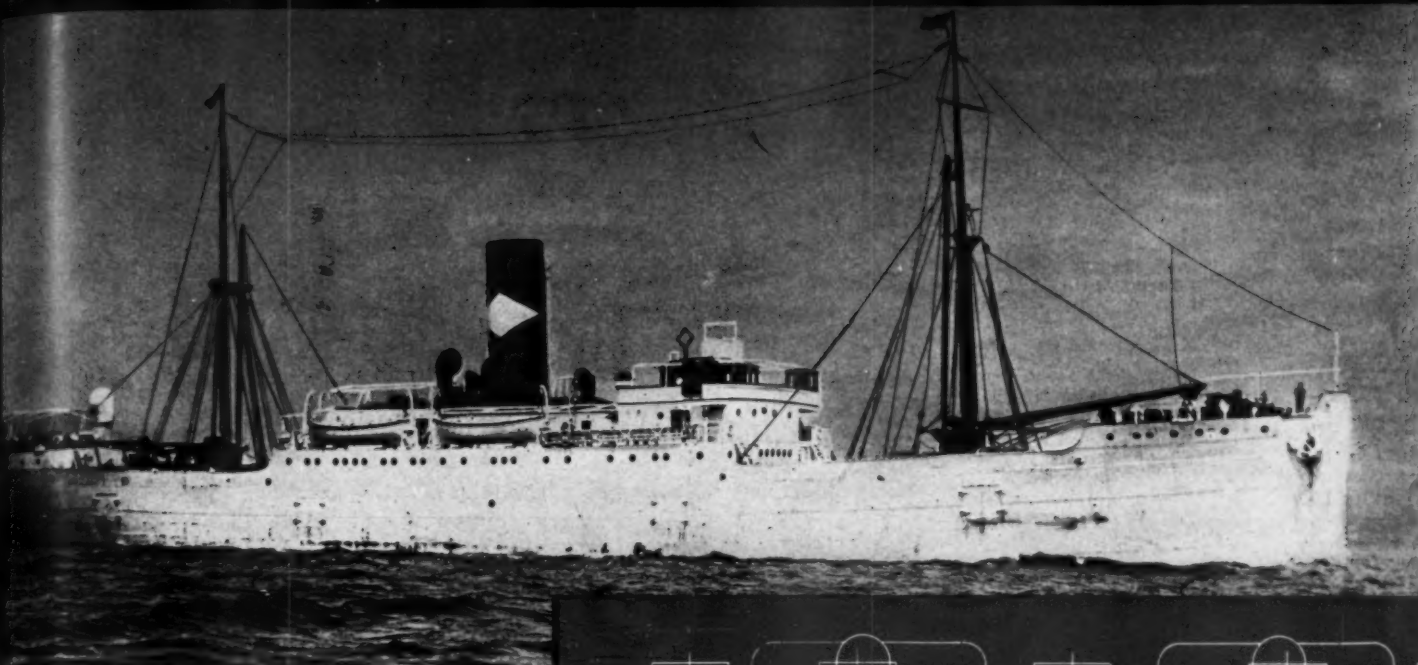


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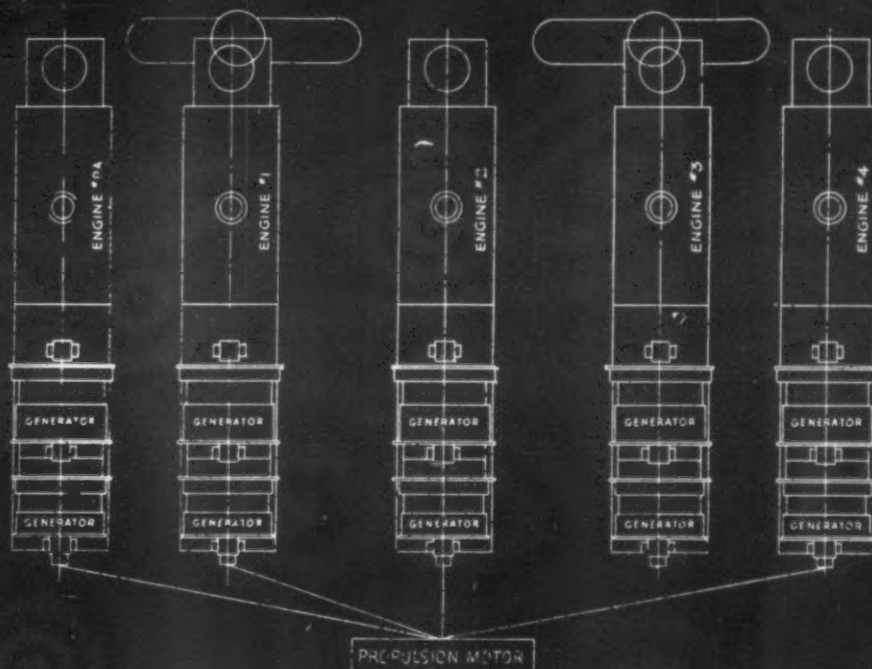
The "La Playa," which is setting a new mode for American cargo ships with its repowering by multiple General Motors Diesel engines.

MULTIPLE DIESEL MARINE DRIVE EFFECTS LARGE ECONOMIES

BECAUSE it may lead to greater speed and more cargo space for American ships, marine interests are watching with unusual interest the use by the United Fruit Company of multiple General Motors Diesel engines in the repowering of the *La Playa*, one of its ships in the Central American service. The *La Playa* is said to be the only American cargo ship now using multiple Diesel engines for main propulsion and auxiliary refrigerating power.

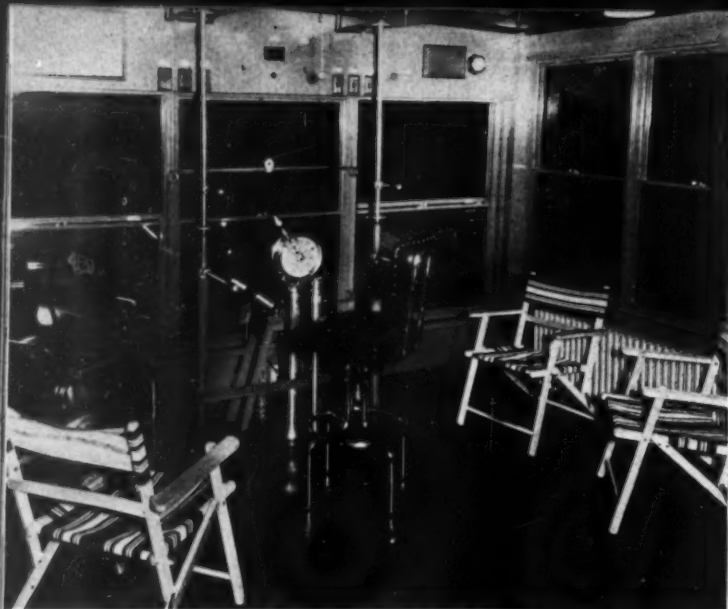
In order to make the fullest possible use of all available boats during the war period, the United Fruit Company recommissioned the *La Playa*, which had been laid up in a Gulf port, and equipped the ship with multiple Diesels.

The *La Playa* is 336 feet long, and has a beam of 48 feet. She was repowered with a battery of five 12-cylinder, 2-cycle General Motors Diesel engines, which gave her not only an increased speed of $1\frac{1}{2}$ knots, thus permitting her to make more trips per year, but also gave her an added 27,000 cubic feet of invaluable cargo space. The Diesel installation includes five 1200 hp. engines. The ship uses only four of the engines at full speed, totaling 2,500 hp. The fifth engine is a reserve of power always on hand for emergencies. Each of the five engines drives a 500 kw. main generator and a 200 kw. auxiliary generator. From the generators, the power is carried direct to a huge driving motor on the propeller shaft. The installation arrangement is

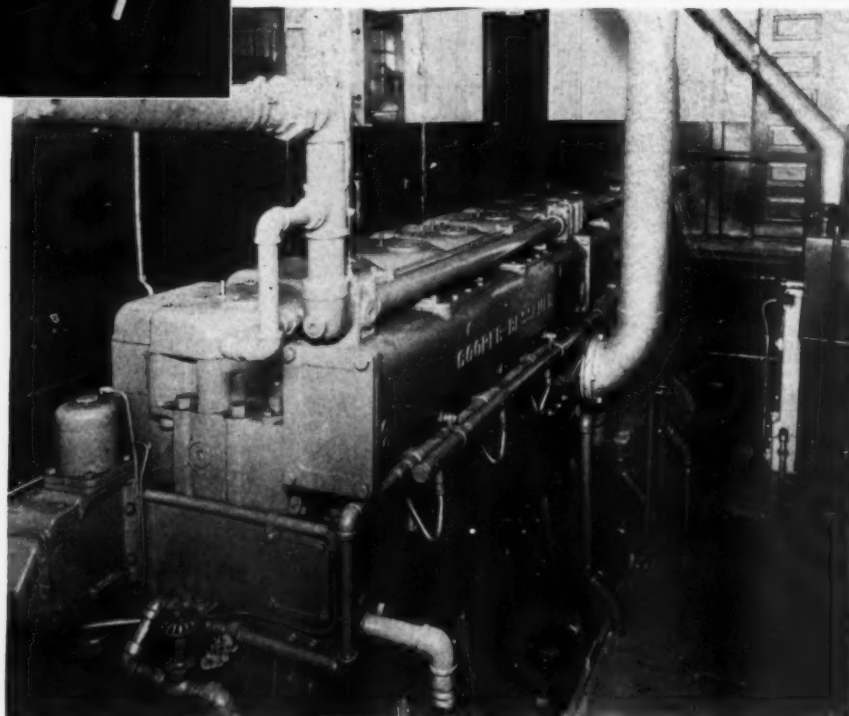


This chart shows how the five General Motors Diesel engines are arranged on the "La Playa" to give the ship greater speed and additional cargo space.

clearly shown on the accompanying chart. The *La Playa*, since being repowered, has been in the Central American service, and has been used for shipping meat to our troops in distant advance bases. Figures made public by the United Fruit Company comparing the multi-Diesel operation of the *La Playa* with reciprocating steam power of her sister ship, the *San Bruno*, show actual operating costs. The *San Bruno* uses 33 bbls. of fuel oil, at \$1.25 per bbl. each day for her steam engines. The *La Playa* uses 11 bbls. of Diesel fuel oil per day, at a cost of \$1.85 a bbl., and 16 gallons of lubricating oil per day per engine, at a cost of 63 cents a gallon. In 20 months operation since being repowered with GM Diesels, *La Playa* has not missed a trip.



**DIESEL
TOWBOAT
"HARRY SIMPSON, JR."
CUTS TRIP TIME
FOUR DAYS**



Upper left: View of the full-vision pilot house showing air operated steering controls. Above: The "Harry Simpson, Jr.," one of the latest river towboats. Left: Engine room view showing the Cooper-Bessemer 810 hp., 450 rpm. main Diesel.

AN UNUSUAL account of the new river towboat, *Harry Simpson, Jr.* was recently reported. On her first round trip from Baton Rouge, Louisiana, to New Madrid, Missouri, the *Harry Simpson, Jr.* completed the run in nine days, about four days less time than normally required.

This new boat which is 103 feet long by 22½ feet wide and 8 feet deep, is powered by a Cooper-Bessemer 8-cylinder, direct-reversing Diesel rated 810 hp. at 450 rpm.

Constructed by The Nashville Bridge Co. of Nashville, Tenn., the *Simpson* is doing a big job in helping to ease the fuel transportation problem by easily handling a million and a quarter gallons of gasoline per trip.

In commenting on the *Simpson's* outstanding record, Mr. John S. Hammes, manager of Simpson Towing Company, Inc. of Charleston, Mo., owners of the vessel, wrote, "It will be of interest to you to hear that no difficulties have been experienced in the engine room. The Cooper-Bessemer Diesel has turned over each and every time we have 'given her air' to start and has not stopped until we wanted her to do so. This dependable performance has been sustained on a river far from normal. When the boat first came out we were faced with a high water problem greater than any ever experienced during the memory of many men now on the river. Later, we had to fight just the opposite, that is, low water and extreme currents. But we have come through in every instance and expect the *Harry* to stay on the job for many years to come."

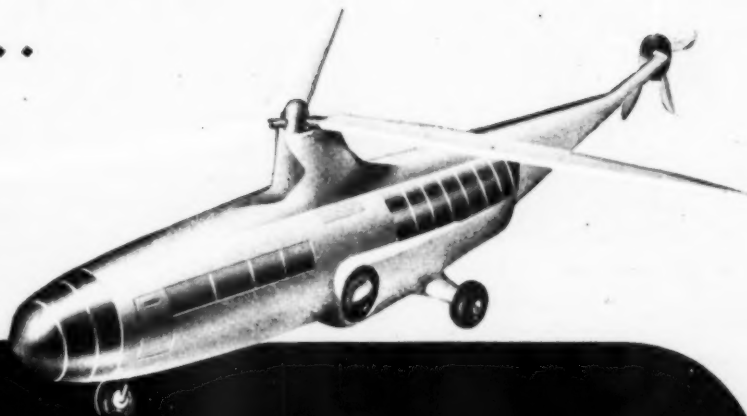
This is of special interest as the barges pushed by the *Harry Simpson, Jr.* were originally of the steel cargo type with square rakes and were converted into gasoline carriers by installing steel tanks. This type barge is conceded to be much harder to push than the modern type of more streamlined petroleum barges.

The *Harry Simpson, Jr.* is of all welded steel construction with many modern design features such as an exceptionally full-visions pilot house. She was recently christened by Mrs. Eleanor Yeandle, wife of the late Captain Stephen S. Yeandle, Coast Guard officer of the Ninth Naval District, St. Louis, Mo., and is a sister ship of the towboat *Gladys Simpson*, owned by Simpson Oil Company of which the Simpson Towing Company is a subsidiary.

I PREDICT...

by **Raymond Loewy**

Noted Industrial Designer



After the war you will travel more than you ever have. And one of the developments that will make it possible is the new helicopter air bus. This remarkable aeronautical achievement ushers in a really new mode of transportation that will enable you to make short air trips quickly, inexpensively and in complete comfort. Present bus terminals will be adapted as landing ports and maintenance hangars so you will take off and arrive in central sections of cities and towns. The multi-passenger helicopter air bus, already endorsed by authorities as entirely practical, will bring air travel to millions of persons and thousands of communities that now lack this form of transportation. When you buy War Bonds today remember they will enable you to experience this and many other marvels in tomorrow's world!

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"DIESEL FUELS"

Conducted by R. L. GREGORY*

AS SUPERVISING and operating engineers, we should all be interested in the subject of "Diesel Fuels," and especially so after dealing with the erratic fuel conditions of the past three years. The trouble with a good many of us is, that we have had so many explanations for these erratic conditions given to us, have read volumes on the subject, heard papers presented and discussions held on the fuel situation, that when we have tried to figure out just what procedure to follow, we have become more or less confused and have ended up by forming a "peeve" of our own on the whole subject of fuels.

And I use the term "peeve" advisedly. Perhaps it should be termed as rather a "set opinion." Perhaps some of us have even assumed the attitude of one engineer, who made the following comment after hearing a lengthy paper and discussion on fuel oils. In part he stated, "I am not interested in the physical properties of the fuel I use as long as it keeps the units rolling and the cost is not excessive."

Whereupon another engineer replied, "I am interested in the fuel I use and vitally so in the physical properties of that fuel, because upon these depends the operation of my units, and the effect upon maintenance costs. I have had some disastrous experiences with fuels having high sulphur content, and high carbon residue, which experiences have taught me to specifically limit the percentages of these properties in the specifications under which I buy my fuel." This engineer had the right idea.

We will all grant that it is of vital importance to know the ins and outs of the fuel you are using, and of making periodical checks on that fuel, but it is also vital to know the units you are operating and to buy fuel suitable for those units. Laboratory tests of fuels in theoretical operation are a help, but they are a poor substitute for tests and performance of fuels in actual operation on your units, so the writer is much in favor of using the old cut and try

* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

method to determine the best fuel for all around economical operation.

Several years ago the A.S.T.M. set up a table giving a selection of Diesel fuels for specific units. They listed five grades of fuel and the types of units to which each grade was applicable, which were as follows:

- Grade 1-D Applicable to all Solid Injection units operating at speeds in excess of 1000 rpm.
- Grade 3-D Applicable to all Solid Injection units operating at speeds of from 360 to 1000 rpm.
- Grade 4-D Applicable to all air injection units operating at speeds under 400 rpm. Also applicable to all solid injection units with cylinder diameters in excess of 16", when operating under 240 rpm.
- Grade 5-D Applicable to air injection units, operating under 240 rpm.
- Grade 6-D A heavy fuel applicable only in rare instances.

At the time these standards were set up by the A.S.T.M. each grade of fuel was manufactured under definite limitations and the vendors of fuel oils were able to keep these grades within the confines of these limitations because there were plenty of raw materials available from which to compound them. But as the war period came on, these raw materials became scarcer and the fuel vendors were forced to use only materials then available. The natural consequence would be a broadening out of these limitations, until today the classifications or rather fuel furnished under these classifications may overlap into another classification, hence not exactly suitable for units designed to burn fuel within specified limits.

The average supervisor or operating engineer, who has not made a study of his units to the extent of knowing just what fuel classifications his units will operate most economically under, and who has secured fuels of different classifications than the units were designed for may find himself wondering why economy has dropped off and the units do not perform the same as they did prior to our entry into the war. He may still be ordering the same grade of fuel and possibly thinks that he is obtaining that grade, when in reality a survey of the physical

properties of prewar fuels and present day fuels, under the same classification, may vary greatly.

To the writer's knowledge this has been the experience of many engineers. With these conditions facing us there will in all probability be an effort made to reclassify Diesel fuels and set up a new set of standards.

There is still another feature which enters into the picture. Considerable contamination of fuels comes after they have left the refineries and are picked up in the process of delivery and handling. Oxidation causes much of this contamination and wherever contamination appears it is usually of an abrasive type which is certainly detrimental to the units if allowed to remain in the fuel. Fuel of this type not only increases maintenance costs but also has a tendency to lower the efficiency of operation, since it produces excessive wear and increases the cost of production.

Manufacturers of purifiers, filters and centrifuging apparatus have found a fertile field for many of their products in the eliminating of those properties which contaminate fuels as well as lubricants. And as a result of these war fuel conditions many of them have made great strides in the development of new apparatus to remove such contamination. They have met up with all sorts of problems and conditions and as a result have doubled their efforts in placing upon the market, suitable equipment which will take care of the wide field of properties which many of our present day fuels contain and which are injurious to the units.

In the next issue of DIESEL PROGRESS will appear several illustrations showing different types and installations of some of these latest developments in fuel conditioning equipment and along with these illustrations, data showing what has been accomplished in plants where such equipment has been placed. Many types of this equipment are wholly automatic, once they are properly put in operation, and this feature eliminates many manhours and the manual and cleaning attending many of the older types of oil purifying equipment

Does Your Product or Process Involve the Flow of Liquids, Gases, Air?

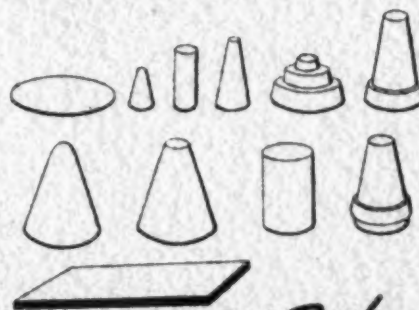
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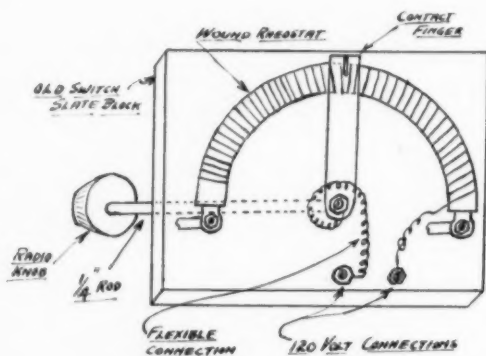
Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

"How We Corrected Voltage Regulator Trouble with a Home Made Rheostat"

SOME time ago we were experiencing trouble maintaining a uniform voltage on some of our distribution lines. Investigation showed that our voltage regulator which is a General Electric, Type TA-125, Form F4 regulator, controlling the voltage of three alternating current generators, was not performing closely enough.

On our particular regulating we have two compensating rheostats, one of which controls the high and low voltage, the other with sharper resistance steps is used for finer regulation. However in order to keep the voltage anywhere near uniform we were compelled to use small weights, which we attached to the dashpot arm. This was rather a tedious task as fluctuations of load, meant a change of weights.



To overcome this, we designed a homemade rheostat, which we mounted on the board, cutting this rheostat in series with the line on the 120 volt A.C. side of the regulator. The accompanying sketch shows how the rheostat was made. We obtained a piece of four naught wire, about fourteen inches long, wrapping it with thin layers of fish paper until it was approximately three quarters of an inch in diameter. Between each layer of fish paper we applied a coating of common water glass. Over this wire we wound several turns of common round element wire, spacing the turns so they would not touch. We then bent the whole into a horse-shoe shape, and fastened the same on an old slate switch mounting. The whole was then

given several coats of waterglass and allowed to dry thoroughly, then the contact surface was scraped clean. This was then mounted on the back of our switch board, a rod running through the board was connected to the contact arm, and on the front of the board we mounted a large knob from an old radio, to the other end of the rod. This made our rheostat and with this simple device we have been able to keep our voltage uniform on all circuits.

The above was contributed by Mr. Ernest E. Didier of Osage City, Kansas and is an example of what engineers can do when equipment is hard to procure quickly, and an emergency arises.

Maintenance of Plant Electrical Equipment

PROPER Maintenance of electrical equipment is of vital importance in the operation of any power plant, especially in plants where all accessories are motor driven and where duplicate equipment is lacking. Many of our later pre-war power plants were equipped with not only dual equipment but also dual controls to the equipment, the purpose of which was insurance against shut downs. These precautions, however, are useless without proper maintenance.

Generators should have frequent inspection, as to cleanliness, condition of collector rings, brushes and brush rigging, connections of all leads, to see that they are tight and are not corroded. In most Diesel plants there is likely to be considerable oil mist, and this mist is picked up by the air currents circulating through the windings and deposited upon the windings. This mist has a tendency to hold dust particles, bugs, lint and other foreign matter in the air and unless removed periodically, will eventually break down insulation. Meager tests have shown this to greatly reduce the dielectric strength of the insulating materials.

In cleaning generators, the proper method is to occasionally remove the stator from over the rotor, by sliding it sideways on the generator soleplates. Then with air at not over 60 lbs. pressure thoroughly blow out all the windings, thus removing all loose dirt and foreign matter. The whole should then be carefully washed with a suitable solution, many of which are on the market today. In the olden days, naphtha and gasoline were frequently used, later carbon tetrachloride was used. However it was dis-

covered that these liquids have a tendency to soften and break down insulating varnishes, and for the most part they have now been discarded for special liquids not so harmful to the insulating properties.

When these liquids are used it is best to apply them with a soft brush, thoroughly brushing the coils and exposed parts, to wash grease, oil, and other clinging particles off. After thoroughly washing the unit in this manner, air is again applied to remove the loosened dirt, which also has a tendency to dry the surfaces. Once this dirt and filth is removed and the coils have become dry, apply a good coat of high grade insulating varnish. The best method for doing this is too apply it with a spray gun, since in this manner, the varnish gets into places which are inaccessible with a paint brush. The whole should then be allowed to thoroughly dry, before the unit is again put in operation. Such maintenance will give longer life to the generating equipment proper.

Oil breakers should be thoroughly examined at least once a year, to make sure that all contacts are making properly, and have not become pitted and burned. This is especially true where the breakers are opened daily. Contacts on all phases should be made simultaneously to eliminate burning. Many breakers are equipped with preliminary arcing points, which take the shock of first make and break contact, to eliminate burning of the main contacts. These should be given special attention. The oil should either be changed or filtered and tested to make sure that it is in useable condition. Frequent making and breaking of oil breaker contacts has a tendency to deteriorate this oil. The oil tanks should be well cleaned and all parts of the breaker kept free from dust and any foreign materials which might cause a short or flash-over, resulting in more serious damage.

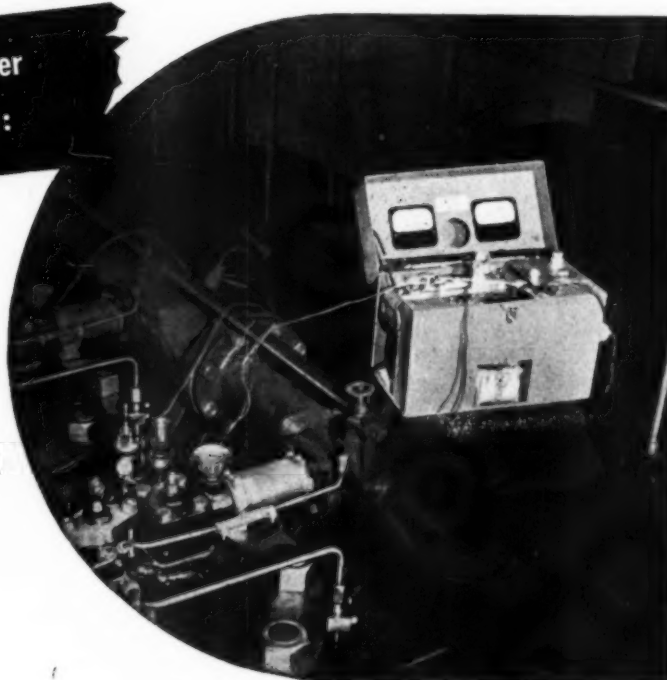
The frequency with which motors and motor controls should be inspected is determined by the type of motor, its necessity for plant operation and its location. If it is an open type induction motor of the older vintage, cleaning should be more frequent. If it is of a later type such as the semi-closed or totally enclosed, or of the dust proof type, inspection of the windings should not be as frequently required.

Most operators in making their rounds, inspect And now please turn to page 88

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WITH THE new Cities Service Diesel Heat Prover it is now possible for you to determine exactly the operating efficiency of your Diesel equipment and make any necessary adjustment long before trouble starts.

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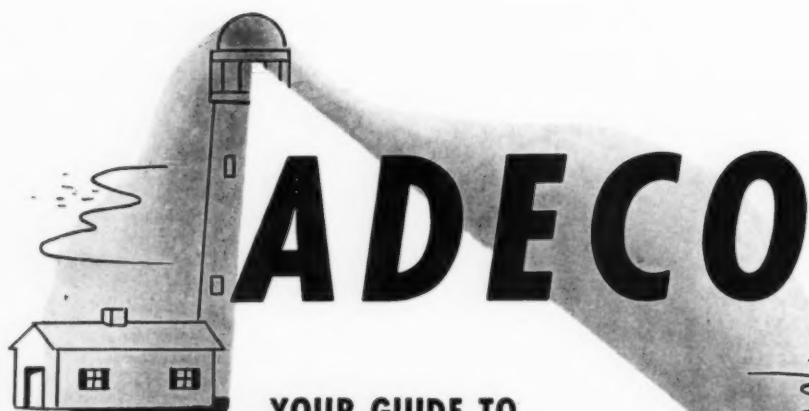
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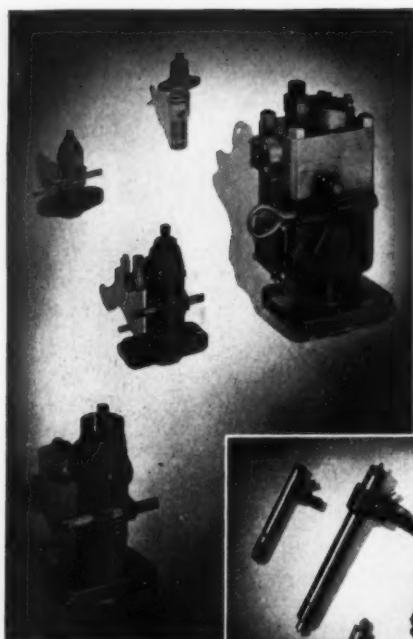
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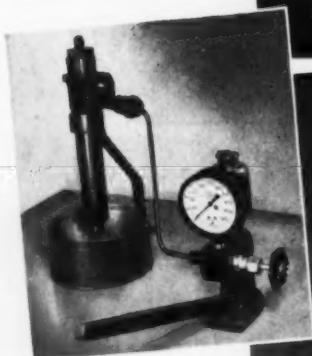
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Reorganized DEMA Elects Harvey T. Hill Executive Director

HARVEY T. HILL of Chicago has been appointed Executive Director of the Diesel Engine Manufacturers Association with offices at One North La Salle Street, Chicago, effective February 16, 1944.



Harvey T. Hill

Mr. Hill is a graduate of the Engineering School of Pennsylvania State College and following that he attended the University of Chicago and received his Master's degree in the University School of Commerce in 1916. He immediately became associated with the Chicago Association of Commerce in the Industrial Department and after several years of very successful work there he was elected Secretary of the Illinois State Chamber of Commerce which organization he served for several years. He then became Executive Vice-President of the Chicago Stock Exchange and later was appointed Secretary-Manager of The Chicago Association of Credit Men which position he recently resigned. Mr. Hill is widely known in business and financial circles. He is a member of the Rotary Club of Chicago, the Economic Club, the Chicago Stock Exchange and the Union League Club of Chicago. The officers of the Diesel Engine Manufacturers Association are: President, Robert E. Friend, President of the Nordberg Manufacturing Company of Milwaukee, Wisconsin; Vice-President, Gordon Lefebvre, President of the Cooper-Bessemer Corporation of Mount Vernon, Ohio and Treasurer, Robert H. Morse, Jr., General Sales Manager of Fairbanks, Morse and Company of Chicago.



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In war and peace, Pedrick *precisioneering* assures correct tension and dimension of rings, with that all-important flatness engineers demand. It's Pedrick's exclusive Heat-Shaping process which makes *precisioneering* possible.

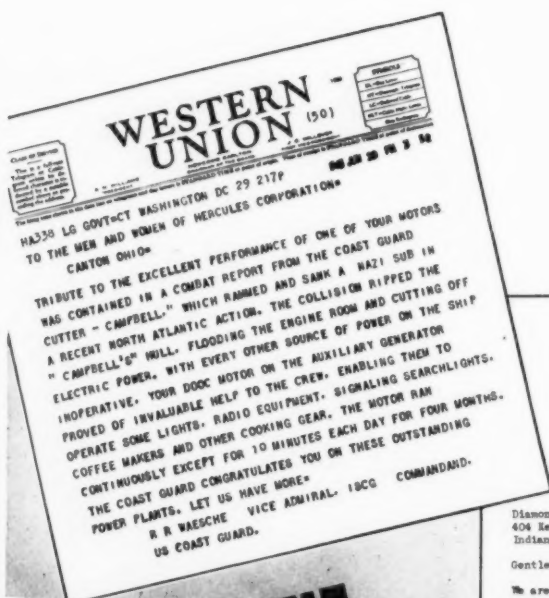
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When the cutter "Campbell" rammed and sunk a Nazi sub in the North Atlantic,—she proved her staunchness by returning safely though seriously injured. With the engine room flooded, the Hercules Diesel engine-generator unit equipped with DIAMOND Roller Chain engine fuel pump drive proved invaluable—it ran continuously, except for 10 minutes daily, for four months.

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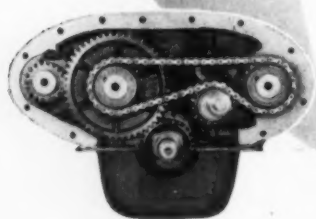


Illustration above shows the Diamond Pump Drive as used on this history-making Hercules.

DIAMOND



ROLLER CHAINS

HERCULES MOTORS CORPORATION
CANTON, OHIO



July 8, 1943

Diamond Chain & Mfg. Co.
404 Kentucky Avenue
Indianapolis, Indiana

Gentlemen:

We are enclosing with this letter copy of a telegram that we received from R. R. Waesche, Vice Admiral, USCG Commandant, U. S. Coast Guard.

We felt that you would be as interested in this as we are as it is through the united efforts of our purveyors and ourselves that we are able to produce products that merit, as the result of actual experience, the confidence and trust of the various Services.

It is our sincere hope that we will all be able to continue and better our efforts and that shortly a complete victory will be the reward of the earnest efforts that we are all putting forth.

Very truly yours,

HERCULES MOTORS CORPORATION

Chas. Balough

Chas. Balough
President

McCulloch Engineering Appoints Donald A. Sutherland Field Engineer

JAMES P. STEWART, Assistant General Manager of McCulloch Engineering Corp., Milwaukee, Wisconsin, has announced the appointment of Donald A. Sutherland as Field Engineer in charge of sales and sales promotion activities. McCulloch, a division of Borg Warner, manufactures superchargers and blower equipment.



Donald A. Sutherland

Mr. Sutherland is a graduate of the engineering school of the University of Minnesota. Before coming to McCulloch, he spent ten years with Fairbanks-Morse in St. Paul, in engineering work relative to the municipal and industrial markets for Diesel engines.

Lloyd Ashby Named Personnel Manager of Perfect Circle Richmond Plant

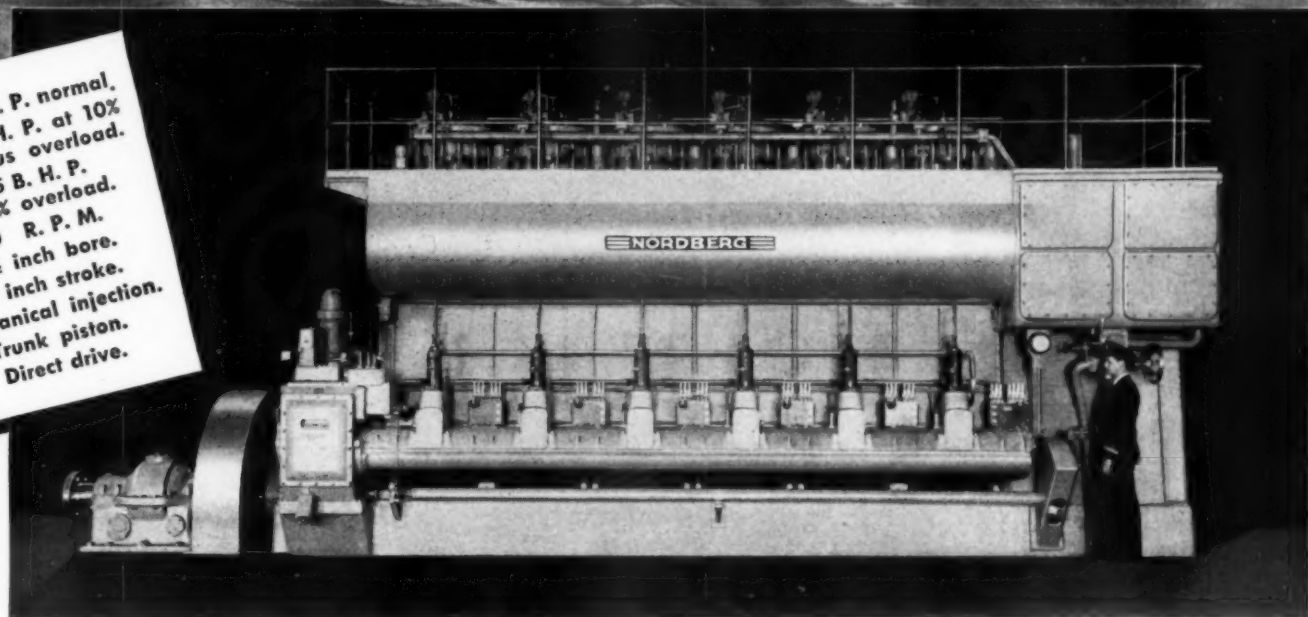
IT has just been announced that Lloyd Ashby has been named Personnel Manager of the Perfect Circle plant at Richmond, Indiana. Prior to this new appointment, Mr. Ashby held the posts of Supervisor of Foreman Training and Assistant Educational Supervisor of the Richmond plant. Before joining the Perfect Circle Company, he was Principal of Junior High Schools in Richmond and in Gothenburg, Nebraska. He also has had experience in educational administration, banking and selling. For the past year Mr. Ashby has been teaching Indiana University Extension classes in personnel management at Earlham College at Richmond.

Mr. Ashby received his Masters degree in the field of education from Columbia University and his A.B. degree from Hastings College at Hastings, Nebraska.

COASTAL VESSELS *propelled with* NORDBERG DIESELS



1700 B. H. P. normal.
1875 B. H. P. at 10%
continuous overload.
2125 B. H. P.
at 25% overload.
180 R. P. M.
21½ inch bore.
29 inch stroke.
Mechanical injection.
Trunk piston.
Direct drive.



Don't say DIESEL-
say **NORDBERG**



THE latest job Nordberg is doing for the United States Maritime Commission is that of supplying seventy-five direct reversing Diesel engines for 4000 ton coastal cargo vessels now under construction. These engines are of the same design as other Nordberg engines now propelling C-1 and C-2 vessels and which have won outstanding recognition for their dependable performance. These vessels engaged in naval supply service and wartime commerce all over the world have demonstrated that Nordberg Diesels can take it.

NORDBERG MFG. CO. • MILWAUKEE 7, WIS.



NORDBERG

DIESEL ENGINES



DON'T PUT A  SQUARE PLUG

IN A  ROUND HOLE

Sheppard

Diesel Marine

AUXILIARIES

Are Built for YOUR

Specific Requirements

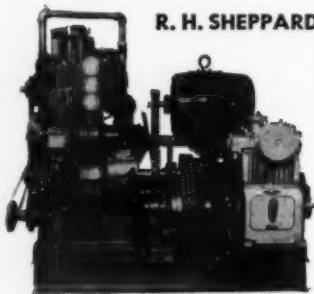
FOR economy and efficiency, the marine auxiliary you install should be designed to meet *your* specific operating requirements.

Fire and bilge pump, compressor, generator, power take-off and hoist—or any combination of these units—can be assembled into a complete Sheppard Marine Auxiliary. These auxiliaries will perform more efficiently, more economically because they are assembled to meet specific requirements.

Sheppard Auxiliaries are powered by the sturdy, dependable Sheppard Diesel Engine—completely equipped with electric starter, simple fuel injection system and fresh water cooling.

Sheppard engineers will give their prompt attention to your inquiry—write today for illustrated specification and data sheet.

R. H. SHEPPARD CO., HANOVER, PA.



SHEPPARD MODEL 7
Marine Auxiliary. Sheppard Diesel Engine, 50 gpm fire and bilge pump, 20 cfm air compressor and 5 kw generator mounted on 56" x 36" base. Unit completely assembled ready to run.

Sheppard
DIESEL MARINE
AUXILIARIES

Boston & Maine RR.

Continued from page 47

fields. Throughout the Eastern part of the USA, where grades are lighter and movements average faster speed than elsewhere, this feature makes for economical and fast operation of heavy trains and little need for airbraking except at speeds above 55 miles per hour, emergency and dead stops. And at 60-70 mile per hour speeds, medium air applications to reduce train speeds to 50 miles per hour will throw the operation of the train within range of the dynamic brakes which can handle the train from there on down to almost a dead stop. And on flat ground, such as in terminals, because the slack is already run in against the locomotive, dead stops can be accomplished by braking the locomotive alone with air, and not touch the trainline at all!

All of which, including the well known footwarmers, windshield wipers, defrosters, acoustic tile soundproofing, soft engineers and fireman's seats, etc., etc., should make Brother Whitney's engineers and firemen anxious to enjoy the thrill of running big, fast freight trains over the mountains of New England—and elsewhere, and anxious to get off the old steam locomotives. Boston & Maine's freight Diesel No. 4200-4201, so numbered because each half of the 4-unit machine may be separately operated as a 2700 hp. light road or branch line freight loco, or transfer locomotive in terminals, or may be uncoupled for overhaul—is the first of four locomotives of identical General Motors design that will be in service by the time this is published. Two initial locomotives early in November of last year followed by two more later in the Winter, were all identical 5600 hp. units for the rough, fast Boston-Mechanicsville run where heavy two-way traffic makes wartime operation an exacting business and climatic conditions are often difficult, with both seasonal extremes of hot and cold temperature. The four locomotive units contain the usual 16 cylinder Model 567 2 cycle General Motors Diesel developing 1320 hp. at 800 rpm., with main and auxiliary generator, all fuel, oil and lube pumps, 2-stage Gardner Denver air compressor for train braking, vertical shaft extensions for the dual roof mounted cooling radiators and traction motor blowers at each end of the unit, for forcing air through the centerplate to the motor housings at track level—all attached and run as a unit through the centralized electropneumatic control system. The usual instrument panel goes with each of the 4 units, with the customary low oil pressure, heating boiler, lube oil and overheat light type signal indicators with gongs as well. Bellytanks under each of the

... That ships can move Materiel-Munitions-Men

I AM PROUD TO FIGHT...

I began life as a 33,000lb. white-hot billet of fine steel. Forging Hammers and Presses, Heat-treating Furnaces, Machines and Men trained me down to fighting weight . . . around 10,000 lbs. ringside.

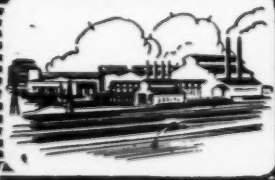
I drive Liberty Ships, Submarines, P-T Boats, the Diesels of War.

I am proud to fight for the United Nations . . .

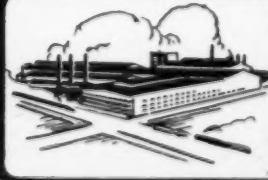
I was wrought, forged, seasoned and machined by expert designers, engineers and craftsmen at Erie Forge Company.

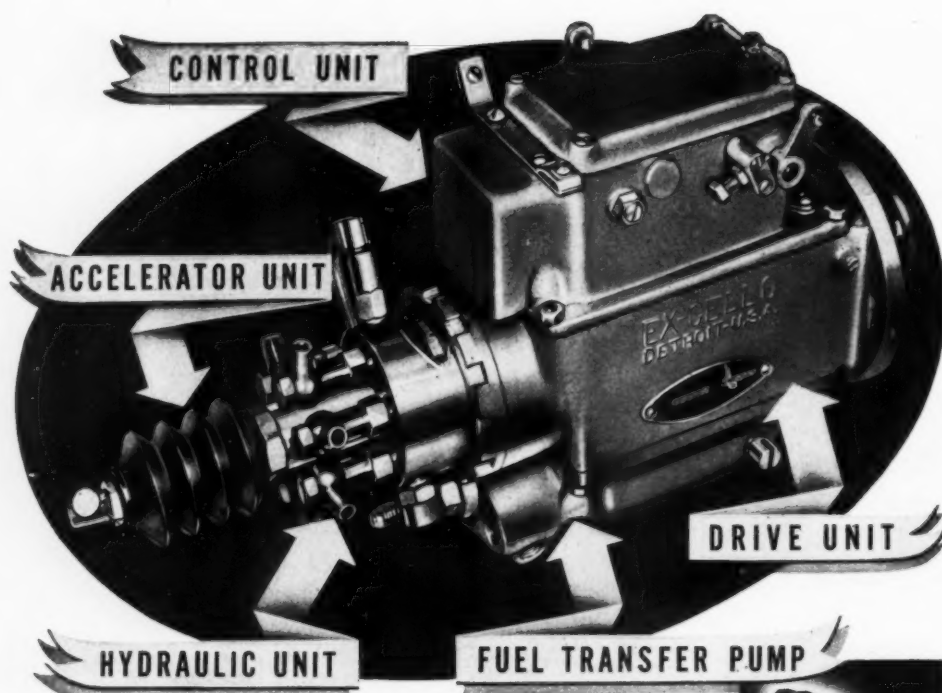
My counterparts..Shafting, Connecting Rods, Crankshafts, Steel Forgings and Castings..are good tough fighters for the battle of the Nations and for Industry.

THROW YOUR SCRAP INTO THE FIGHT



ERIE FORGE COMPANY, ERIE, PA.





EX-CELL-O Replaceable Unit Construction Provides Many Advantages

The Ex-Cell-O Diesel Fuel Injection Pump is an assembly of units consisting of hydraulic, accelerator, control, and transfer pump units mounted on a drive unit arranged for flange mounting on the engine. The proven dependability of Ex-Cell-O Pumps enables this equipment to provide trouble-free operation with a minimum of service attention. However, when servicing is required, the Ex-Cell-O design permits convenient, time-saving, low cost, modern servicing by simply replacing the one unit that requires attention. Specifically:

Servicing can be done by any mechanic, with ordinary tools.

Only the particular unit requiring servicing need be sent to the depot for repairs.

The entire pump is out of service only a matter of minutes. Re-calibrating the pump in the field is not necessary, as each unit is properly calibrated before it leaves the factory.

Ex-Cell-O Fuel Injection Equipment has been thoroughly proven in the severest kind of service, both military and commercial. For complete information concerning Ex-Cell-O Diesel Fuel Injection Equipment, Diesel engine builders should address Diesel Division, Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit 6, Michigan.



Ex-Cell-O Nozzle and Holder Assembly



**EX-CELL-O
DIESEL FUEL INJECTION
EQUIPMENT
EX-CELL-O CORPORATION - DETROIT**

four units carry 1200 gallons of fuel oil, or 4800 for the locomotive. The entire locomotive is 194 ft. 4 inches overall length (coupler facings) and exactly 15 ft. from top of the rail to top of the two-way air whistles, and the same 9 ft. rigid wheelbase as in the first freighter and 40 in. diameter steel wheels and 61:16 gear ratio on the traction motors.

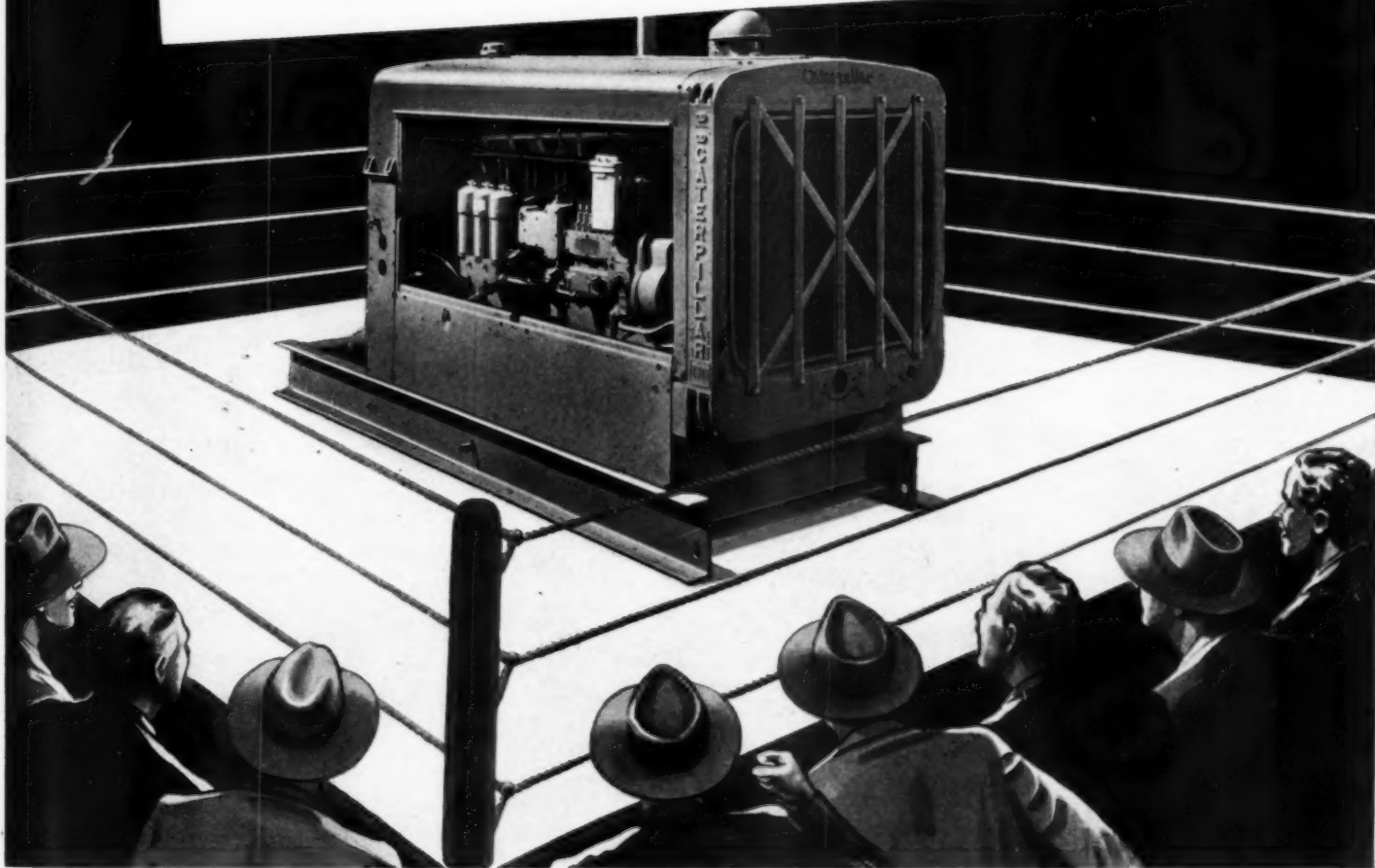
Resistance grids for the dynamic brakes occupy roof space over the top of the engines, with self contained motor blower. The "A" or operating sections, contain a large pair of battery boxes (Exide) opposite the end containing the welded steel, blunt-snout operating cab, while the "B" or non operating sections carry no battery box but in its place a small steam boiler (Vapor Car Heating Co.) and a 300 gallon boiler water tank, and a toilet for the crew. Thus each pair of 1320 hp. sections forms a complete locomotive unit, permanently coupled together with bars and a folding diaphragm between the ends. Conventional couplers and control circuit receptacles are fitted between the ends of each pair of operating units, including the elaborate coupling for the main trainline control circuit for operating the traction motors either under power or as dynamic braking. Total weight is 450 tons, including about five or six tons of added weight for dynamic braking, mainly the grids.

The engineer's stand is equipped with conventional train and locomotive brake controls, throttle and the transition-brake lever and rheostat for use during braking. Seats for 5 are fitted in the operating ends.

Otherwise Boston & Maine has a tried and true type of machine, already proved in "actual combat" on 24 different American railroads. And "actual combat" includes everything from head-on collisions, 60 below, 134 above, light trains at 70 mph., heavy ones at 20; rough ones on stop and go; easy turnarounds and workhorses 24 hour daily grinds and on everything from level to 3 1/2% grades. Every indication points to this railroad setting a new pace for Diesel Freight Locomotive utilization, and progress up there in Massachusetts will be keenly watched by everyone interested in getting the lead out of America's vast, but tradition-wrapped railroad Colossus.



BARE-KNUCKLE CHAMPION



THE "Caterpillar" Diesel Engine is all-time bare-knuckle champion in its class. It packs more power and can take more punishment than any other heavy-duty engine of its size.

No other Diesel built can match the simplicity of this engine—more important than ever when skilled operators are scarce. It's as nearly fool-proof as an engine can be made. There are only three simple operating adjustments—valves, fan-belt and water pump.

From fan to flywheel, the whole engine is "Caterpillar"-built. The fuel system is typical of sound "Caterpillar" design and construction. It requires no adjustments whatever. It can burn any type of fuel that's handy, from cleaned crude oil out of a pipeline to high-octane gasoline. And its fuel economy is famous the world over.

"Caterpillar" Diesel Engines are built for full-load, full-time work—for more productive hours on the job and longer life. They have positive protection against dust, mud and water.

Ease of servicing is a big factor in their favor. Every part that is subject to wear can be replaced with a minimum of labor and expense.

Because "Caterpillar" Diesel Engines are used to power so many different types of equipment—such as excavators, compressors, crushers, locomotives, gravel plants and rollers—it is possible to standardize on them and thus reduce service and operating

costs. And they can be hooked up in multiple installations with no loss in efficiency and definite advantages in work output.

Right now, "Caterpillar" Diesels are contributing millions of rugged horsepower to winning the war. With the coming of victory, our full production will once more be available for peacetime jobs. In the meantime, your "Caterpillar" dealer is fully equipped to keep your present machines in running order. Call on him for counsel and service. And if you are qualified to get a new "Caterpillar" Diesel, he will explain how you can apply for it.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL



TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

New Staynew Intake Filter Permits Ground Level Filter Installation High Level Intake

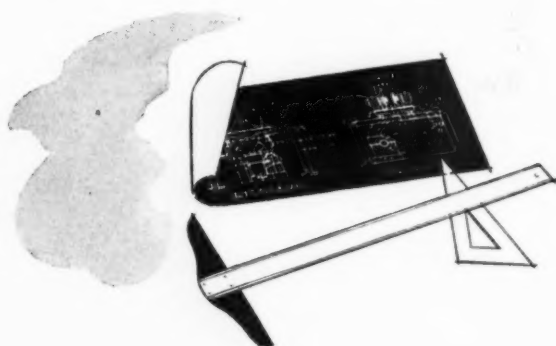
PARTICULARLY in the case of intakes for air compressors, authorities recommend placement of intake pipe openings outdoors where air is cooler. Frequently, high level placement is also recommended to avoid concentrations of dust and dirt more likely to be present nearer the ground.

Very often, placing the air intake opening in-

side presents an air filter service problem, since servicing is frequently neglected when personnel must work in cold, snow, or rain . . . particularly if trips to slippery, windswept roofs are required.

To solve this problem, Dollinger Corporation (formerly Staynew Filter Corporation), has recently developed a new intake filter for compressors and internal combustion engines. This new filter may be installed and subsequently serviced at ground level—right in the engine

POST WAR PLANNING



Our VISCO-METER* production for government requirements is well ahead of schedule, so we're thinking of you—and tomorrow.

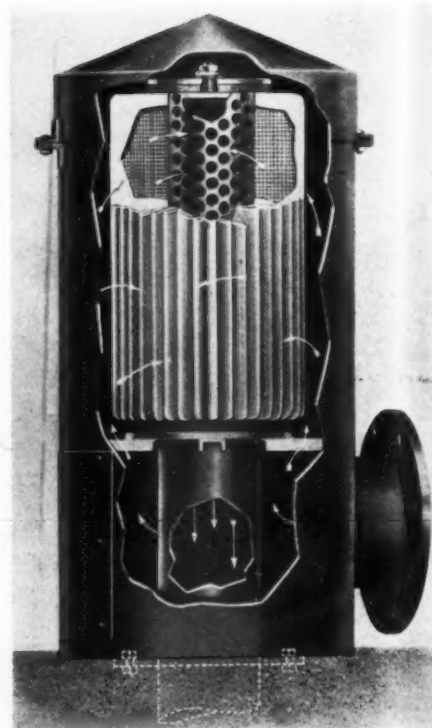
Whether or not you eventually decide that VISCO-METER* can be a most useful "operation feature" and "sales point" is not so important at the moment. The important point is do you *know* the complete VISCO-METER* story—what it is—what it does—why other manufacturers of

internal combustion engines (both gasoline and Diesel) have made VISCO-METER* part of their engines?

The VISCO-METER* story is a technical story you can't afford not to hear. For that reason we are inviting every manufacturer, engineer or designer concerned with the production or marketing of internal combustion engines to write us. Arrangements will be made for a meeting in your office—without obligation.

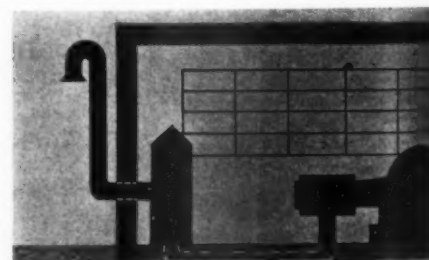
VISCO-METER
CORPORATION GROTE ST., BUFFALO 7, N. Y.

*VISCO-METER has been in world wide service for fourteen years. Fully covered by U. S. and Foreign patents.

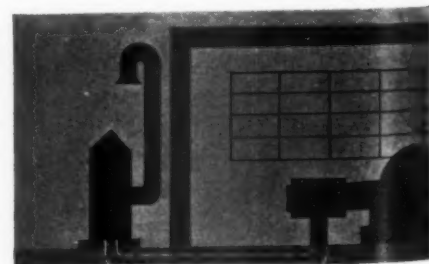


Sectional view of new Staynew Filter.

room itself, if preferred—while the air intake opening may be located elsewhere at the most suitable point.



Sketch of filter unit inside building.



Sketch of filter unit outside building.

The new filter provides all the features of the Staynew and Protectomotor dry type intake filters. Combination silencer-and-filter models are available.

Servicing is extremely simple, as the actual filter insert can be lifted out through a removable panel, and either cleaned by brushing, by compressed air, or by washing.

Reprints Offered

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Reprints of Vibration Study Offered by Cooper-Bessemer

AN 8 page reprint of a technical paper entitled "The Vibration Characteristics of 'Free-Free' Circularly Curved Bars" is being offered by The Cooper-Bessemer Corporation. Reporting the outcome of an extensive study, the paper is considered a valuable contribution to engineering in connection with the behavior and design of piston rings.

Taken from a recent issue of the publication, "Journal of Applied Physics," the material was prepared and written under the direction of W. A. Pliskin and J. E. Edwards of Ohio University, and F. P. Bundy, Harvard University, with the collaboration of engineering officials of The Cooper-Bessemer Corporation whose interest in the preparation of the data also included the furnishing of accurately machined ring specimens used in various tests upon which the paper was based.

The discussion deals with the experiments conducted to determine certain vibration characteristics, the results of which furnish data that make it possible to calculate with reasonable accuracy, the frequency of vibration, parallel or transverse, of any incomplete, free-free, circularly curved bar of uniform cross section where its mechanical constants are known.

Reprinted on a good grade of paper and liberally illustrated, copies are available by writing to The Cooper-Bessemer Corporation, Mount Vernon, Ohio.

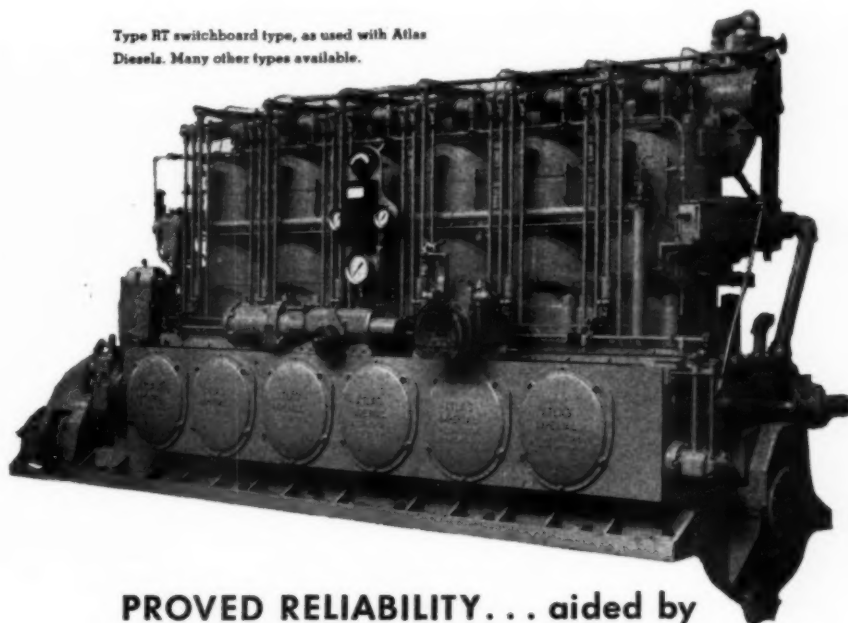
Men From 14 Nations Attend Sperry Gyro-Compass School

COMPLETING courses taking from 10 days to three months, 2,942 men representing 14 United Nations were graduated during 1943 from the Marine Gyro-Compass School maintained by the Sperry Gyroscope Company for training in the operation, maintenance and overhaul of Gyro-Compass equipment used by naval and merchant ships, according to a report by J. J. Brierly, Marine School supervisor.

In addition to those graduating in the gyro-compass course, 5,804 midshipmen and cadets from U.S.N.R. training ships and the Merchant Marine Academy at King's Point, L. I., were given two-day indoctrination courses, the report said.

Among the graduates of the Sperry School were natives of England, Brazil, Africa, Norway, Canada, Australia, New Zealand, Belgium, Denmark, Latvia, Philippine Islands, and France, as well as the United States

Type RT switchboard type, as used with Atlas Diesels. Many other types available.



PROVED RELIABILITY... aided by **Alnor** EXHAUST PYROMETERS



This type of 400 hp heavy duty Atlas Diesel provides reliable power for hundreds of the standardized all-steel tugs used by the armed forces and commercial tug boat operators. As you will find on the majority of Diesels, afloat or ashore, Alnor Exhaust Pyrometers are installed on these Atlas Marine Diesel engines. The dependable check of exhaust temperatures with the Alnor Pyrometer is a reliable guide to high-efficiency operation and accurate adjustment and maintenance. In these days of continuous heavy duty operation the protection of a dependable check on engine operating conditions is of greatest importance.

Alnor Exhaust Pyrometers are built in a complete range of sizes and types, single and multi-point, to meet the needs of any type of engine, large or small. Write for Bulletin 2819.

ILLINOIS TESTING LABORATORIES, INC.
420 North La Salle Street
Chicago 10, Illinois

Exchange Maintenance Ideas,

Continued from page 74
the oil in motor and generator bearings and ascertain whether the oil rings are working. Oil should be drained at frequent intervals, the bearings flushed and new oil installed. For all practical purposes on standard speed motors, a good grade of 30 S.A.E. oil can be used. On motors with a speed of 3600 rpm. or higher it is well to get the manufacturer's advice on the proper grade of oil to use, since many of them are particular on this point.

On d.c. motors, slip ring motors, or other types of motors, having brushes and commutator or collector rings, both brushes and commutators should be inspected weekly and any irregularity corrected. Brush holders should be kept clean and the brushes should be tested as to tension and freedom of movement within the brush holder. Position should be checked also, to ascertain that the brush holder has not become loose and moved on the brush holder support.

Motors equipped with ball bearings should

have the same care, with the exception that in most cases, they need greasing only once or twice a year. In such types of motors, the bearings should be well cleaned at least once a year, the balls and ball race flushed and cleaned and a new supply of grease inserted. Care must be taken in applying this grease, in order that too much is not installed. A ball bearing requires a minimum of grease and should not be packed tightly, as this causes the bearings to heat excessively.

Motors which have commutators should be examined frequently to see that the commutator has not worn to the extent where the insulation between segments becomes high causing brush chatter and poor contact with the commutator surface. This insulation should always be kept undercut. Also motors which have rotors with coil construction and banded should be inspected to see that the bands are tight and the insulation under the bands firmly in place. Many a motor of this type has been ruined due to bands becoming loose and wearing through this insulation.

It is well to inspect your transformers at least once a year, to ascertain that all connections are tight, breathers functioning and transformer oil in good condition. On large power transformers the oil should be removed at least once a year, filtered and tested for dielectric and insulating qualities. A certain per cent of moisture always accumulates over a period of time and if allowed to gather in too large a quantity, will eventually cause a breakdown of the windings.

The Marley Company Opens Houston Office Under Ray T. Jenkins

THE Marley Company, Inc., of Kansas City, Kansas, manufacturer of cooling towers and spray nozzles, has established a new divisional office at 2006 Esperson Bldg., Houston, to provide immediate and direct sales and service covering of the Texas Gulf Coast, Northwestern Louisiana and Southwestern Arkansas. The new office adds its increased facilities to those in Dallas, Corpus Christi, San Antonio and El Paso where the company's representation remains unchanged.

Ray T. Jenkins, formerly in charge of the Tulsa divisional office, heads the Houston division. Mr. Jenkins joined the Marley organization in 1933 and represented the company in Dallas for three years before assuming direction of the Tulsa territory in 1937. He is well known in mechanical engineering, industrial and air conditioning circles throughout Texas, Oklahoma and Arkansas.

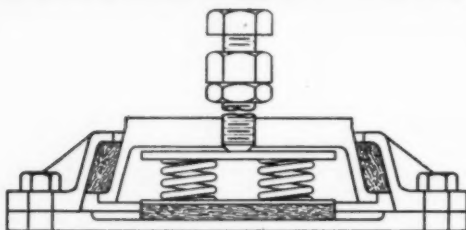


Long live the "Duke"

The "Duke" has been performing her strenuous towing chores for over 55 years. Now, owned and operated by the Diesel Tug Wathen Corp., she has taken a new lease on life.

Completely repowered with new main and auxiliary Diesels, she goes back to vital War Work where they can't afford any costly lay-ups. So they buy insurance — KORFUND Vibration Control Equipment — to prolong the life of the Diesels.

Any time, any place, under any conditions — KORFUND has the answer to your Vibration problems.

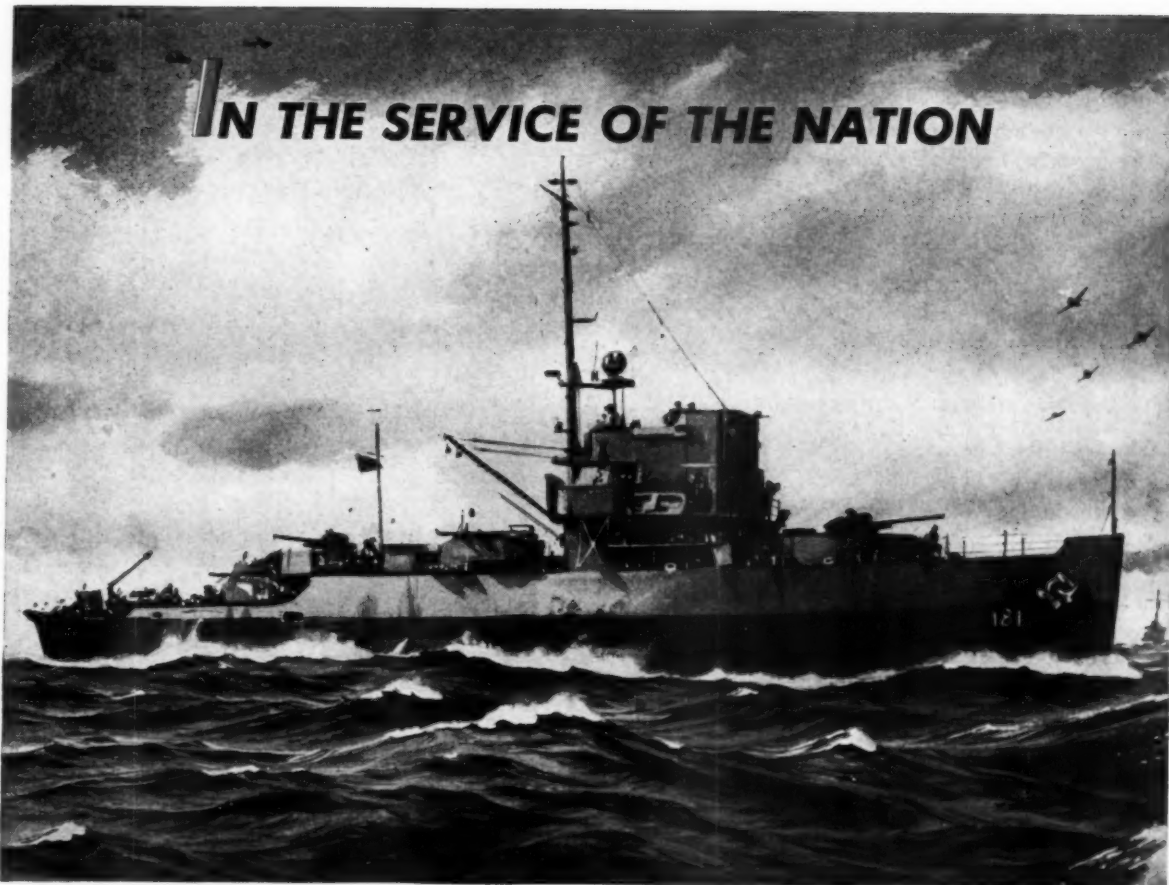


KORFUND Vibro-Damper, a widely used vibration Control product, incorporates steel springs as the isolating medium. Absorbs lateral thrust, in addition to the normal impact load.



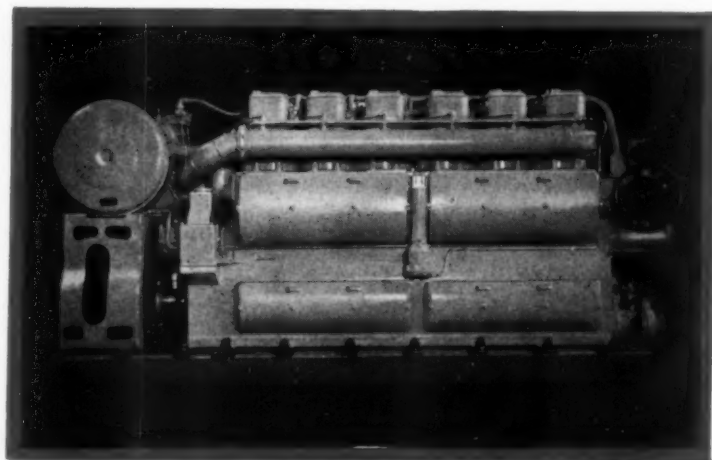
THE **KORFUND**
48-24 THIRTY-SECOND PLACE

COMPANY, INC.
LONG ISLAND CITY, I, NEW YORK



The main propelling plant consists of two Alco, 6 cylinder, $12\frac{1}{2}$ x 13 turbo-charged Diesel engines.

This Alco Diesel, due to its exceptional ruggedness, is eminently suitable for heavy duty services. It is in successful operation in Tankers, Tug Boats, Cutters, Hydraulic Dredges, Cargo Vessels, Public Utility and Municipal and Industrial Power Plants, Irrigation, Pipe Lines, and Railway Motive Power.



**AMERICAN
LOCOMOTIVE**
AUBURN, NEW YORK



What They Say About The Gas Turbine

Continued from page 66

Further Limitations

The stumbling block throughout the years has been the fact that a gas turbine prime mover has to produce net power as well as to compress the air which produces by combustion or otherwise the fluid which drives the turbine. Attempts to overcome this obstacle, however, led to the development of the modern turbosupercharger and another important apparatus, the centrifugal compressor now used almost exclusively throughout the world for blast-furnace blowing and many other industrial purposes.

Further Pertinent Remarks

"Beginning about 1890 both the steam turbine and the internal combustion reciprocating engine began the competition which finally resulted in the elimination of the reciprocating steam engine as a prime mover, except for the steam locomotive, and some ship installations."

With regard to gas and steam turbines now in use operating at temperatures around 900 to 1000 F., Dr. Moss remarked "But to a 'red-hot' gas turbine enthusiast" (which Dr. Moss no doubt is), "who lathers himself into a white heat in trying to get white-hot gas turbines, a mere 900 F. is almost a refrigerator temperature. But it is a step on the way."

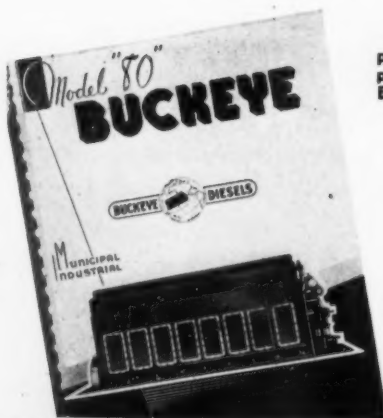
where there is no water whatever. He pointed out also the disadvantage of having to set the gas turbine in motion before it is available as a prime mover. This requires not only a separate prime mover but, also, the more essential element of time; that, whereas a Diesel engine can take its load within seconds after starting, it is a matter of minutes before a gas turbine is available. This is a particularly disadvantageous feature in such applications as ship propulsion, emergency standby units, and many others.

Further Pertinent Remarks

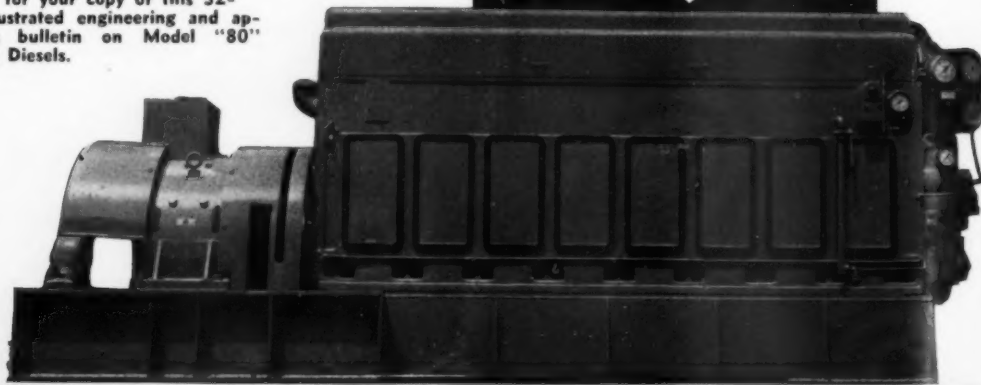
In the marine field, Dr. Lucke believes that steam turbines have a definite edge in large vessels say from 10,000 hp. up. In these larger units, steam turbines show efficiencies up to 36% and he feels that gas turbines cannot, at the present time nor for a long time in the future be expected to develop efficiencies exceeding this. He questions that a gas turbine installation can be made at any lower cost than a large steam turbine job because of the very large sections required to handle the large volume of low pressure gases in the gas turbine. He pointed out that the business end of a steam turbine, that is, the part which produces most of the horsepower is the high-pressure end, which is small in section and inexpensive to build, also, that the low pressure end is simply added to get the utmost out of the steam. By comparison, the gas turbine must be proportioned all the way through for low pressures and is, therefore, correspondingly larger, heavier and more costly per unit of power developed. He does not look upon the gas turbine as a very formidable competitor of Diesels and he doubts seriously whether the gas turbine can be made to develop overall thermal efficiencies even equal to Diesels.

Buckeye Diesels have been known through the years as dependable and unusually economical power units—so proved in almost every type of installation where these qualities mean greater savings and higher profits. Under the stress of war-time power needs—however good Buckeye Diesels have been—we are learning how to build them better; years of experience are being telescoped into these war months to the end that better Buckeye Diesels will be available to power all kinds of peacetime industries.

Direct Drive or Electric Units 75 hp to 960 hp



Write for your copy of this 32-page illustrated engineering and application bulletin on Model "80" Buckeye Diesels.



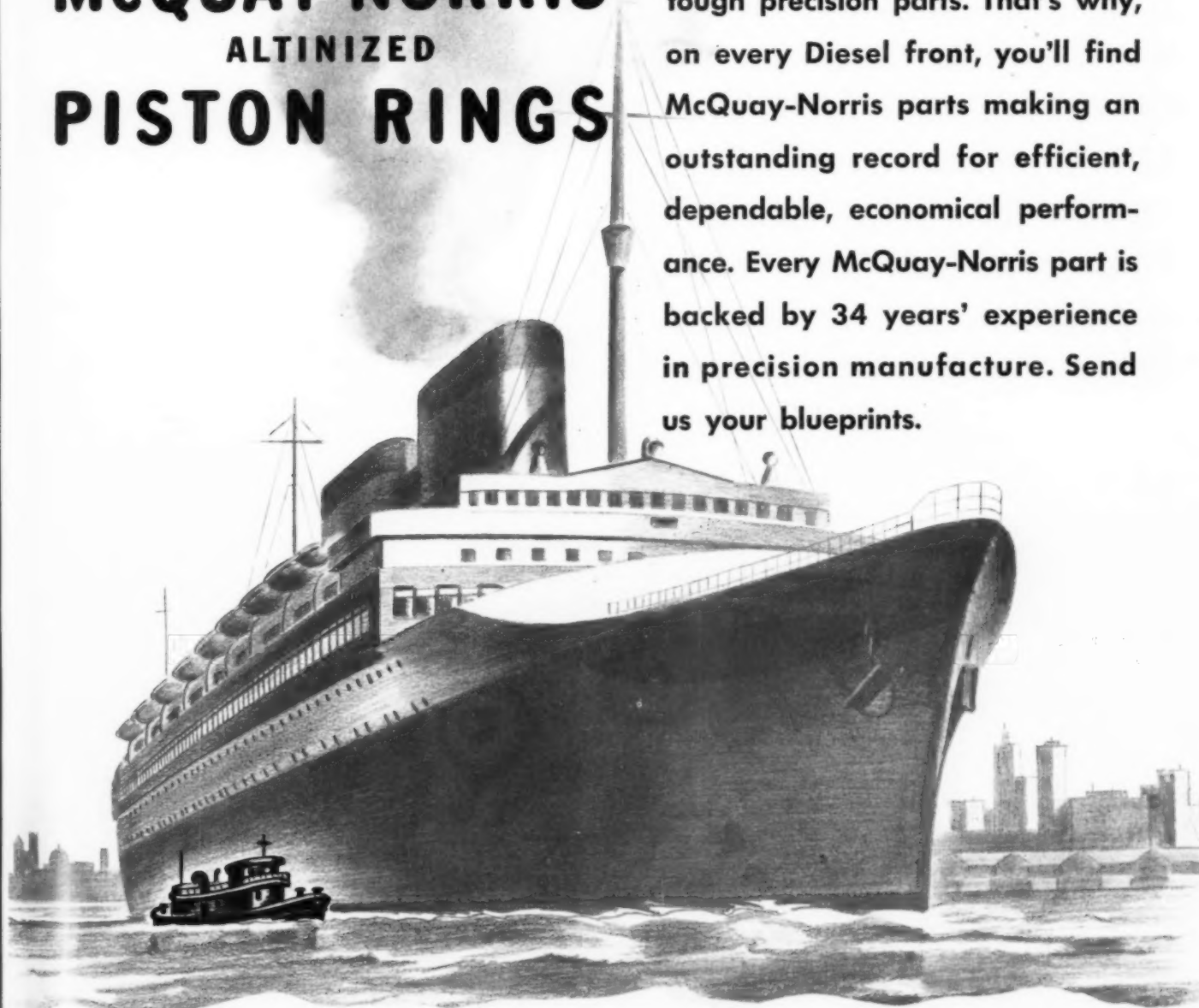
ENGINE
BUILDERS
since 1908

Be Profitwise and Dieselize with Buckeyes
THE BUCKEYE MACHINE COMPANY LIMA, OHIO

Parts built for Toil and Sweat

McQUAY-NORRIS ALTIMIZED PISTON RINGS

Diesel engines have tough work to do . . . and tough work demands tough precision parts. That's why, on every Diesel front, you'll find McQuay-Norris parts making an outstanding record for efficient, dependable, economical performance. Every McQuay-Norris part is backed by 34 years' experience in precision manufacture. Send us your blueprints.



*Awarded to two plants
McQuay-Norris Ordnance
Management Division*

McQUAY-NORRIS

MANUFACTURING COMPANY

ST. LOUIS, MO.



PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

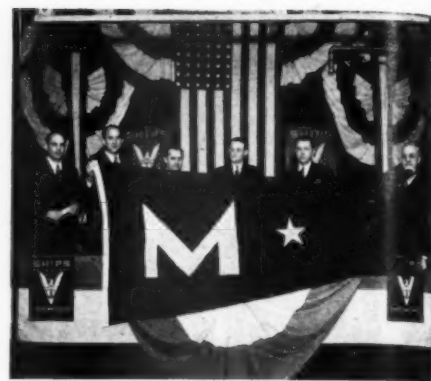
Maritime "M" to C. Lee Cook

THE highly prized "M" pennant for meritorious production was awarded to the C. Lee Cook Manufacturing Company of Louisville, Ky., on January 22, 1944 at the company's plant.

Mr. Chas. E. Walsh, Jr., Director of Procurement, and Mr. Howard C. Fulwiler, Division of Public Relations, of the U. S. Maritime Commission, came from Washington to make the award.

Mr. Walsh, in his presentation speech, pointed out the important part ships are playing in the war effort and complimented the management and workmen of the company for its production of COOK'S Packings on such a large scale in keeping with the delivery requirements of the shipbuilding program.

Other speakers explained COOK'S Packings were first introduced in 1888 and the important part they have played in both the Navy and



Presentation of Maritime "M" award to C. Lee Cook Mfg. Co. Left to right: C. J. Kremer, Assistant to President; Mr. Durham, President; Chas. E. Walsh, Jr., Maritime Commission; Robert E. Kirn, Vice President; Howard C. Fulwiler, Maritime Commission; George Hess, Shop Superintendent.



..From Sub..
..to Towboat..



NUGENT FILTERS and OILING DEVICES

Give added life to DIESEL ENGINES



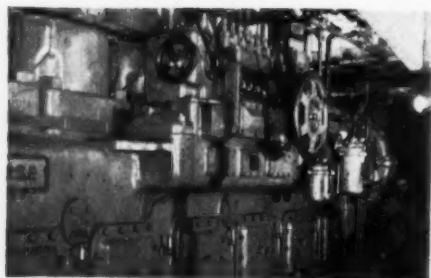
The filtering of lubricating oil on many of Uncle Sam's underseas crafts . . . the furnishing of Sight Flow Indicators for speedy patrol vessels . . . the filtering of fuel oil on some of the nation's newest streamlined towboats. These are but some of the important wartime duties for Nugent

Filters and Oiling Devices.

In wartime or peacetime there's a full-time job for the product that can do the job better. That's why Nugent Filters and Oiling Devices for 46 years have been so popular in the marine field. Write today for latest bulletins and details on the complete Nugent line.

WM. W. NUGENT CO., INC.

Since 1897
415 N. Hermitage Ave. Chicago 22, Ill.



Industrial Equipment Co.,
6435 Hamilton Ave.,
Detroit 2, Michigan
H. J. Kelley, 816 Harvard
Ave., New Orleans 13, La.
Thos. A. Short Co., 245
Fremont St., San
Francisco, Calif.

Dallas S. Deem, 1215 So.
St. Louis Ave., Tulsa
5, Oklahoma.
Harian G. Boster, 4452
W. 59th Pl., Los Angeles, Cal.
In Canada—Darling Bros.
Ltd.

Portion of one of the two main engines aboard the Ohio River Company's new towboat "Henry S. Sturgis." View shows the Nugent Filters through which the fuel oil is pumped. The oil moves from the day storage tanks through another set of Nugent Filters to the injection pump reservoirs.

NUGENT FILTERS

SINCE 1897

Merchant Marine in the past, naming in particular the last reciprocating-engined battleships and over 50% of the Emergency Fleet ships that were built in World War I having been equipped with COOK'S Packings.

Cleveland Diesel Reports Activity for 1943

THE activity report for the year 1943 of the Cleveland Diesel Engine Division of the General Motors Corporation marks a high point for this division in the powering of vessels for the United States Navy. George W. Codrington, Vice-President of General Motors Corporation and General Manager of the Cleveland Diesel Engine Division, pointed out that there were 1,353 acceptances by the Navy of various types of vessels powered with Cleveland Diesel engines. This figure represents more than three acceptances each day. Codrington said, "To do a job of such magnitude, it is necessary to have an equal number of dock trials each day, as well as a proportionate number of vessels under various stages of construction at all times."

He also said, "These figures bear out the statement that that part of the expansion program which the Navy delegated to our organization has been well executed and handled. Of course, our fine production record could not have been attained had we not had the full support of the Bureau of Ships."

Cleveland Diesel furnishes engines to the Navy ranging from 150 to 2,000 horsepower which are used as main and auxiliary marine power equipment. Among the types of vessels using GM Diesels are: destroyers, destroyer escorts, minesweepers, landing craft, tow boats, submarines, tenders, rescue vessels, submarine chasers, transports and Coast Guard vessels.

That more planes may fly

Today, endless caravans of giant trucks are rolling night and day all over the face of America . . . all dedicated to but one proposition: That more planes may fly . . . that more ships may come down the ways . . . that a nation may have everything it needs to fight—and win!

To perform this essential job . . . to make sure that it will be done in the minimum time and with the minimum cost in equipment, manpower and precious fuel stores . . . the country's biggest operators are using the power that, for more than a decade, has been setting the pace in economy, speed and dependability—*Cummins Diesel Power*.

So marked has been this trend to Cummins in the motor transport field that 90% of all long-line, heavy-duty, diesel-driven trucks are now Cummins-powered. Here is ample proof that major fleet owners have learned that the surest way to "get there fustest with the mostest" is to power with Cummins Dependable Diesels. CUMMINS ENGINE COMPANY, Columbus, Indiana.

This is the fifth in a series of advertisements depicting the war-time role of Cummins Diesel Power in the nation's basic industries. If you are operating Cummins Diesels on your job, make doubly sure of their most efficient use by providing for their proper maintenance and service. Ask your Cummins Dealer for details.



Lubricating Oil Reclaiming Trailer Unit for the Armed Forces

THE conservation and transportation of lubricating oil has become a very serious problem. To "keep 'em rolling" at the front, the Youngstown Miller Company of Sandusky, Ohio has designed, built and delivered to the Marine Corps a mobile lubricating oil reclaimer for use back of the lines as the troops advance. Mounted on the trailer, is a standard type Y-M reclaimer, a Diesel electric generating set, clean

oil storage tank, fuel oil tank, and waterproof storage bins for refinery earths, filter papers and spares.

In operation, a charging pump conveys the dirty oil from drums on the ground to the heating tank, where it is brought to a sufficient temperature in intimate contact with refinery earth to dissipate the volatiles.

The heating process is controlled by thermostats, and when the proper temperature is



A complete, self contained, portable lube oil reclaiming unit built by Youngstown Miller Co. for the Marine Corps.

reached, the oil is dropped into a transfer tank, then forced through a two-stage filter by compressed air, thence out to clean oil receiving drums.

The reclaimers are built in eight sizes to meet any requirements for the purification of dirty lubricating oils from Diesel, automotive and aircraft engines, as well as for hydraulic, vacuum pump, and transformer oils.

The Y-M Reclaimer is of the contact earth filtration type, utilizing common refinery earths available on the open market, and is designed to remove non-lubricating volatiles by slow heating; solid and asphaltic materials by filtering, and is capable of removing fuel dilution, water, acids, solid and colloidal carbon, dirt and the like, thus restoring the used oils to substantially the same values of fire, flash, viscosity, color, neutralization number, precipitation number as the new or parent oil.

Northwestern Diesel-electric Locomotives Average 738 Miles Every Day

MORE than 1,300,000 miles of service has been added to the performance of the five newest Diesel-electric power units of the Chicago and North Western Railway Company's Streamliner "400" fleet during the past twelve months, it was announced by R. L. Williams, chief executive officer of the railway company.

During their two years of wartime service ending January 12 the five streamlined units traveled at total of 3,066,455 miles with very few unscheduled interruptions, Williams said. In the past year the units piled up 1,347,166 miles, averaging more than 738 miles per day, seven days a week, for each power unit on regular scheduled runs.

"The five units and twenty-five streamlined cars were purchased and delivered in 1941 primarily

★
*Miracles
in
Precision*
★



"CHICAGO SCREW" QUALITY PRODUCTS are unexcelled for accuracy

For more than seventy years, The Chicago Screw Company has been manufacturing hardened and ground screw machine products—most of them involving the toughest operations.

Our precision parts represent the acme of accuracy because throughout every step of production they are checked, inspected and gauged again and again.

We at Chicago Screw have the background, the engineering experience and machinery—plus the "know how"—to help you with your most intricate screw machine problems for Diesel use.



THE CHICAGO SCREW CO.

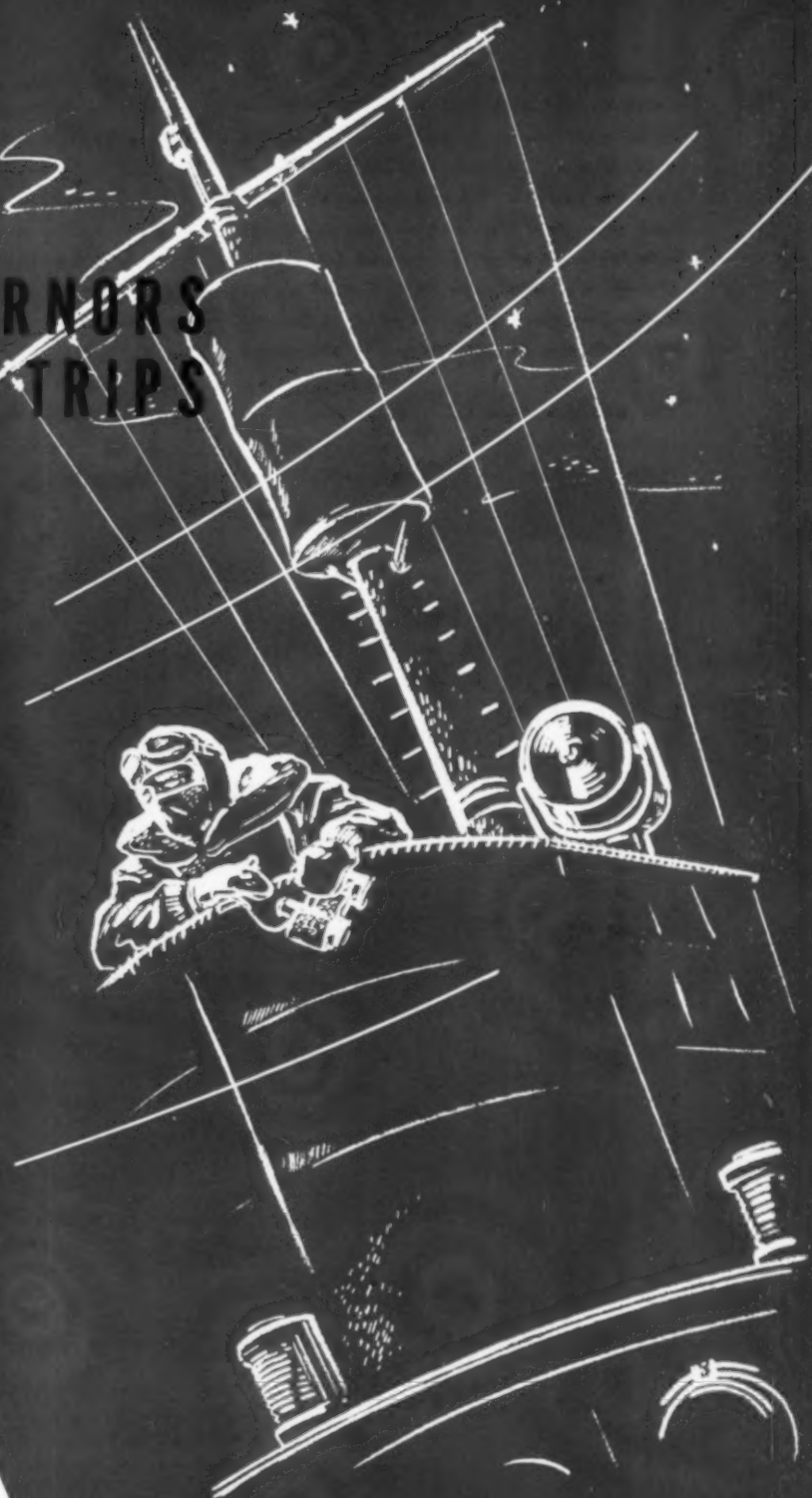
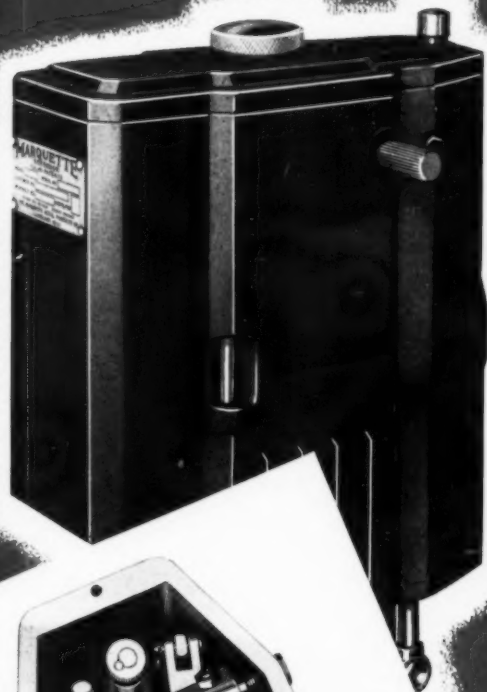
ESTABLISHED 1872

1026 SO. HOMAN AVENUE

CHICAGO, ILL.

Marquette

HYDRAULIC GOVERNORS and OVER-SPEED TRIPS



... constantly on the job



The **Marquette** METAL PRODUCTS CO.
CLEVELAND 10, OHIO

Manufacturers of: HYDRAULIC AND ELECTRIC WINDSHIELD WIPERS FOR AIRCRAFT
HYDRAULIC GOVERNORS FOR DIESEL ENGINES • ROLLER BEARING TEXTILE SPINDLES • FUEL OIL PUMPS
AIR COMPRESSORS • PRECISION PARTS AND ASSEMBLIES

to meet peacetime requirements," Williams said. "Actually, the trains did not go into regular service until five weeks after the United States declared war, but their introduction at that time was particularly advantageous in helping meet the rapidly increasing wartime transportation needs. The new streamliner fleet meant not only additional trains to serve America, but it also permitted the release of steam locomotives and cars for needed service elsewhere."

The new equipment, identical to that of the

Twin Cities "400", made possible the expansion of the North Western's streamliner service between Chicago and points in Minnesota, Wisconsin and upper Michigan where many war industries are located.

W. A. Thorpe Joins Elliott

THE addition of W. A. Thorpe to the Marine Department of Elliott Company is announced by F. W. Dohring, general sales manager of the firm. Thorpe, who has a long record of experience in the marine field, will make his head-

quarters in the company's New York offices.



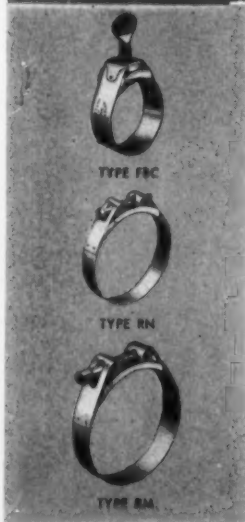
W. A. Thorpe recently joined Elliott Marine Department.

A Yale graduate in electrical engineering, Thorpe was an ensign in the Navy during World War I and saw action in the North Atlantic. After the war he became connected with the General Electric Company in various marine application engineering capacities and as assistant manager of the Federal and Marine Departments, handled merchant marine, navy and government business. Thorpe comes to Elliott from executive positions at Bethlehem shipyards in Hingham and Fore River, Mass.

Thorpe has served for many years as alternate director of the National Council of Shipbuilders, and is a member of the Society of Naval Architects and Marine Engineers and of the Society of Naval Engineers.

McCarty Company Celebrates

THE McCarty Company, one of the oldest and largest advertising agencies on the West Coast, during February, celebrated its 25th anniversary. Founded in 1919 by T. T. McCarty, the agency has grown from its meager beginning with McCarty and one stenographer to a well staffed, "busy shop," handling more than fifty large industrial advertisers, numbered among whom are many of its original clients—something worth celebrating. McCarty's creed through his first quarter century in the agency business has been—"Good Advertising Pays," and his company has become known as a champion of trade journals—having favored these media as the backbone of numerous industrial

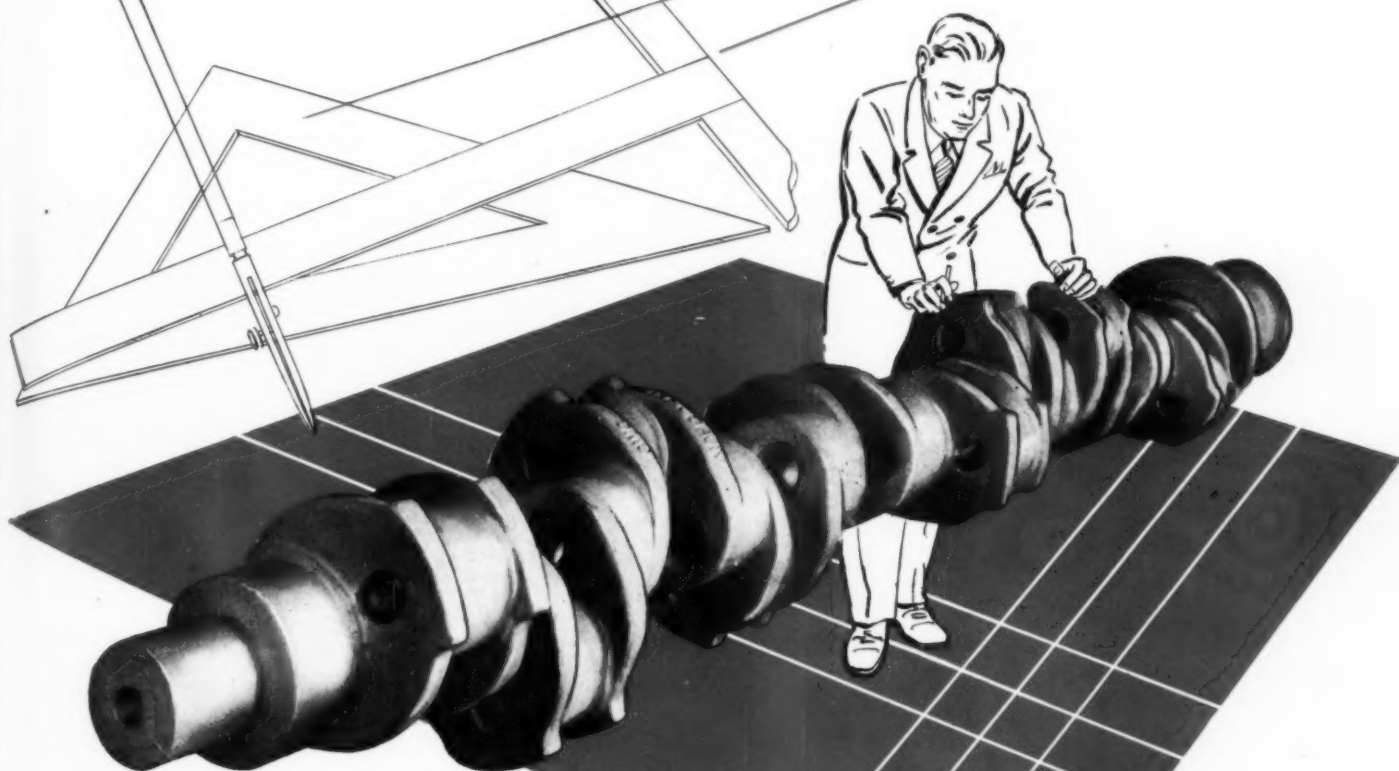


FOR DIESEL APPLICATIONS Strong—Dependable—Easily Installed

The dependability of Wittek Hose Clamps, long accepted by the automotive and aviation industries, is now being proven by actual service with the armed forces of the United Nations as standard equipment for aircraft, tanks, jeeps, trucks, ships and other combat vehicles. Wittek Hose Clamps are made in many different sizes and types for Diesel applications: Type RW for hose connections of 5" in diameter and larger; Type RM for 3½" to 5"; Type RN for 2½" to 3½" and Type FBC for 2½" hose connections and smaller. Write for new descriptive catalog. Wittek Manufacturing Co., 4305-15 West 24th Place, Chicago 23, Illinois.

WITTEK *HOSE CLAMPS*
Dependable Hose Connections

CAST OF ELECTRIC FURNACE ALLOYED METAL



Illustrated is the type of shaft furnished for over 9 years for the Fairbanks-Morse famous O-P Diesel Engine.

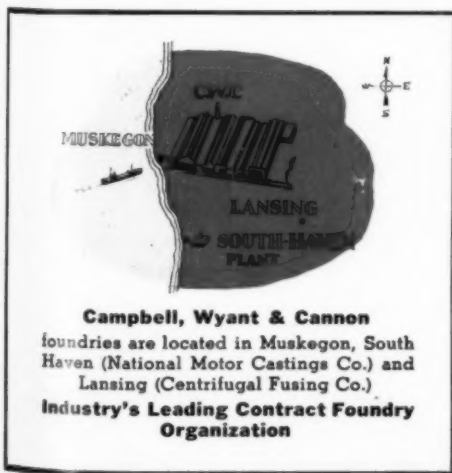
C.W.C. PROFERALL* CRANKSHAFTS OFFER UNLIMITED DESIGN IMPROVEMENT POSSIBILITIES

Proferall* Cast Crankshafts provide engine builders with complete freedom of design unrestricted by limitations inherent in crankshafts made by other manufacturing methods. In addition, cast crankshafts of electric furnace alloyed metal provide these advantages:

- **Improved bearing life.** Hardening of bearings is unnecessary for long uninterrupted service.
- **Tremendous savings in machine time.** Extreme accuracy in casting of cheeks and other dimensions make machining unnecessary except on bearing surfaces.
- **Counterweights cast integral with crankshaft** further reduces machining time and other production costs.
- **Important saving in weight.** The coring of main bearings and crank pins with a consequent saving in compensating counterweights provide a sizable economy in the original casting as well as in finished weight.

Proferall* Cast Crankshafts, during the past 10 years, have compiled a record of outstanding service under the severest operating conditions in every field—industrial, automotive, railway and marine. C.W.C. offers engine builders limitless opportunity for product improvement and production economy. Consult C.W.C. engineers and metallurgists freely about your crankshaft problems.

***PROcess FERrous Alloy**



Campbell, Wyant & Cannon
foundries are located in Muskegon, South
Haven (National Motor Castings Co.) and
Lansing (Centrifugal Fusing Co.)
**Industry's Leading Contract Foundry
Organization**

CAMPBELL, WYANT & CANNON FOUNDRY CO.

MUSKEGON, MICHIGAN

schedules. Some of the "old timers" who have grown up with McCarty are H. E. (Hi) Cassidy who joined in 1929 and became Vice President in 1932, C. G. (Davy) Davenport whose service goes back to 1930—now on leave to aid Uncle Sam; also Willard Wilde, a 1935'r, now San Francisco manager; Wentworth Mann who joined in 1936 and is now Senior Account Executive, and C. W. Haines, Art Director since 1926. Then there is R. S. "Rod" Reed, newest member of the organization, manager of the recently established Pittsburgh office. So Mc-

Carty is off for another 25 years of service in the industrial advertising field.

SKF Appoints Walter C. Ahlers Detroit District Manager

ROBERT R. ZISETTE, general sales manager of SKF Industries, Inc., Philadelphia manufacturers of ball and roller bearings, announces the appointment of Mr. Walter C. Ahlers to the position of Detroit District Manager to succeed Mr. Robert H. Hirsch, resigned. Mr. Ahlers has held the position of Assistant District Manager of the Detroit office for a number of years.



TOMORROW THEY WILL FLY!

Today Bill and Jane and Mother look to the skyways! Dad may already ride the airlines. Perhaps he holds his pilot's certificate, too. But tomorrow they all will fly. Family flying must be safe flying and safe flying must be fire-safe. That's why the Guiberson air-cooled radial diesel engine, using fuel that will not burn even when exposed to flame, is the power plant for the family plane of tomorrow. Guiberson powered equipment is now hitting the Axis in distant corners of the world. It is ready today to serve American industry with fire-safe power on land, on sea and in the air!

AMERICA'S RADIAL
AIR-COOLED
DIESEL ENGINE



- No Fire Hazard
- Lower Fuel Consumption
- Increased Cruising Range
- Greater Stamina
- Dependable Operation
- Instant Response to the Throttle
- No Ignition System
- Lower Cost of Fuel
- Constant Torque at All Speeds
- No Radio Interference

Guiberson U.S.A.
THE GUIBERSON DIESEL ENGINE COMPANY
THE GUIBERSON CORPORATION
Aircraft and Heater Division
DALLAS, TEXAS CHICAGO, ILLINOIS

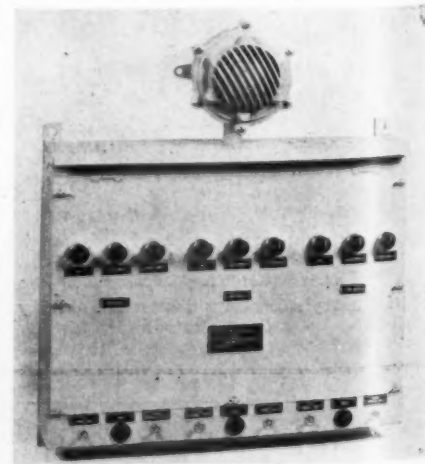
Automatic Alarm System Features Centralized Panel Boxes for Single and Multiple Engine Protection

FLECK Engineering Company, manufacturer of the Brown Automatic Alarm System has issued Bulletin No. 10, illustrating and describing this complete Diesel engine protective system. Type "C" and Type "E" alarm panel boxes, for single and multiple engine installations, respectively, are featured.



Alarm panel for single engine.

The system consists of an alarm panel box in which are centralized warning lights and test switches for oil pressure, water temperature, and electric circuit also an electric alarm horn. This box may be mounted directly on the engine, or on the switch board or in any suitable place in the engine room. The system also includes a throttle switch, the purpose of which is to disconnect the Alarm System from the batteries or other electric source when the engine is stopped. Fleck Engineering Company, 1505 Eastern Ave., Baltimore 31, Md., will supply copies of the Brown Automatic Alarm System Bulletin No. 10 upon request.



Alarm panel for multiple engines.

Diesel Engineers Will Meet in Tulsa, May 8-10

FEATURING a timely and exceptionally interesting technical program, the 17th National Oil and Gas Power Conference will be held at the Mayo Hotel, Tulsa, Oklahoma, May 8-10. Present indications point to an unusually large representation of engine and accessory manufacturers at the exhibit to be held in connection with the meeting.

To save time in these busy days, the tentative program planned for the three days, arranged is as follows:

	Monday	Tuesday	Wednesday
Morning	Registration	Technical Session	Technical Session
Noon	All-Engineers Luncheon
Afternoon	Technical Session	Inspection Trips	Technical Session
Evening	Informal Banquet	Technical Session

The Monday session will include a timely paper on the present status of the gas turbine and another on recent developments in turbosupercharging. Tuesday's session will center around power-plant design and operation, featuring papers on Gas-Diesel engines, exhaust systems and pipeline-plant operation and maintenance. Both sessions on Wednesday will be devoted to the problem of engine control and governing, with three papers on control for aircraft, railroad and marine engines, a paper on special problems of governing Diesel generators operating in parallel, and a paper on control of pipeline engines.

The Tuesday evening session, to which all engineering groups in Tulsa will be invited, will include an unusual film and talk on aircraft maintenance, sponsored by one of the large airline companies. Present plans for inspection trips include a visit to the maintenance shops of one of the large pipeline companies and possible visits to a bomber assembly plant and an oil refinery.

Maxim Silencer Adds Star To Army-Navy "E" Pennant

IN A letter dated Dec. 9th from Admiral C. C. Bloch, USN (Ret.) Chairman of the Navy Board for Production Awards, The Maxim Silencer Company of Hartford, Connecticut, was notified of a renewal of the Army-Navy "E" Award originally presented last spring.

In his letter to Mr. Hiram Maxim, president of the company, Admiral Bloch said in part "The men and women of The Maxim Silencer Company have achieved a signal honor by continuing their splendid production in such volume as to justify this renewal of their award. In the first instance it was difficult to win the

3266 H.P. CAPACITY With Standard Replaceable Elements

Standard elements that fit the 163 H.P. MICHIANA Filter serve the whole line up to 3266 H.P., being employed singly or in multiples up to 20 for the largest. But in all cases the same radial-flo type MICHIANA Replaceable Elements are used—simplifying stocking and servicing.

The filtering efficiency of MICHIANA Lubricating Oil Filters has well been proven on hundreds of thousands of engines in industrial, construction and transportation service and on military equipment, naval and cargo vessels. Leading builders of gasoline and Diesel engines have had years of experience with MICHIANA Filters, recognizing their practical features, thorough oil-filtering advantages which contribute to engine performance, reduce oil consumption and engine maintenance. Engine life is conserved,—and unnecessary delays, premature wear, and replacement of parts eliminated.

The oil cleaning is accomplished without causing any other change, and the unusual filtering capacity is due to the greater absorbing area of the type of selected long fibre and mechanically treated cotton.

FILTERS FOR ENGINES OF 50 H.P. AND LARGER

MICHIANA Oil Filters include also complete range from 50 H.P. up. In addition to the Replaceable type Elements, Re-Packable types are also available. . . . Write for new Bulletin 44-D.

MICHIANA PRODUCTS CORPORATION
MICHIGAN CITY, INDIANA



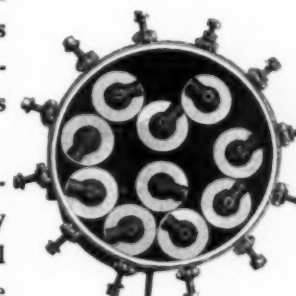
Standard filtering element used singly or in multiples in wide range of filter capacities.



The employees of MICHIANA have been honored for their achievement in War Production.



MICHIANA No. 24150, 3266 H.P., 74 1/2" high



Top view shows elements which are 20 in number, 10 sets of two each connected in tandem.

MICHIANA OIL FILTERS

Army-Navy "E" and by meriting a renewal, the management and employees have indicated their solid determination and ability to support our fighting forces by supplying the equipment which is necessary for ultimate victory."

On Oct. 29th, The Maxim Silencer Company received another award, this from the Treasury Department, when the company was authorized to add the Treasure "T" and Star to their Minute Man Flag. This award was made "for distinguished service for Maxim employees in recognition of their attainment of the cash quota for the purchase of War Bonds through the Payroll Deduction Plan."

Oakite Issues De-Scaling Manual

DESIGNED to meet the demand for practical information on methods for quickly and safely ridding water-cooled and water-circulating equipment of insulating lime-scale and rust deposits, a new 28-page Oakite De-Scaling Manual, revised and enlarged, is now available to works managers, plant superintendents, mechanical supervisors, and other power plant executives responsible for wartime maintenance.

The manual contains 28 pages of concise, prac-

tical data that is now being successfully used to step-up output of existing equipment, shorten shut-down time and conserve manpower in cleaning and de-scaling varied types of equipment. Among them are gasoline and Diesel engine cooling systems, lube oil and jacket water coolers, refrigerant condensers and compressors, surface condensers, feedwater heaters and other heat exchangers.

In connection with this work, it is stated that an acid-type, scale-dissolving material, known as Oakite Compound No. 32, eliminates the hazards to personnel and equipment so frequently involved in the use of commercial raw acids and avoids the need of tedious time-consuming mechanical methods on a wide range of scale and rust removal work.

Copies of this specially prepared, illustrated manual are freely available on request. Write to Oakite Products, Inc., 22D Thames Street, New York 6, N. Y.

Portable Heating Tanks

ONE of the many special kinds of special heating tanks now being built by the Youngstown Miller Company, is shown upper right.



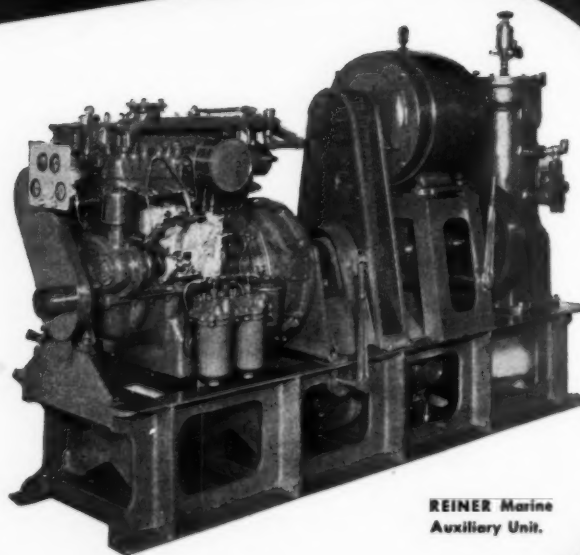
This particular machine, Model 20, is portable and consists of a well insulated heating tank equipped with electric heaters—a motor and pump for circulating the oil—thermostats for maintaining the oil temperature within certain limits—complete with electric controls, valves all mounted on casters.

Although the illustration is of a portable job, most requirements of heating tanks are for stationary units and these are manufactured in a large range of sizes with or without mechanical agitation.

REINER *Made to Order*

Diesel Marine Auxiliary Units and Generating Sets

"Made to order" . . . yes, even in these days when mass production from the assembly lines is the expected method, Reiner Diesel Marine Units and Generating Sets are "made to order" to fit auxiliary requirements exactly. That's what makes them the better buy . . . what has influenced such exacting buyers as Army, Navy, Coast Guard and Maritime Commission to accept Reiner.

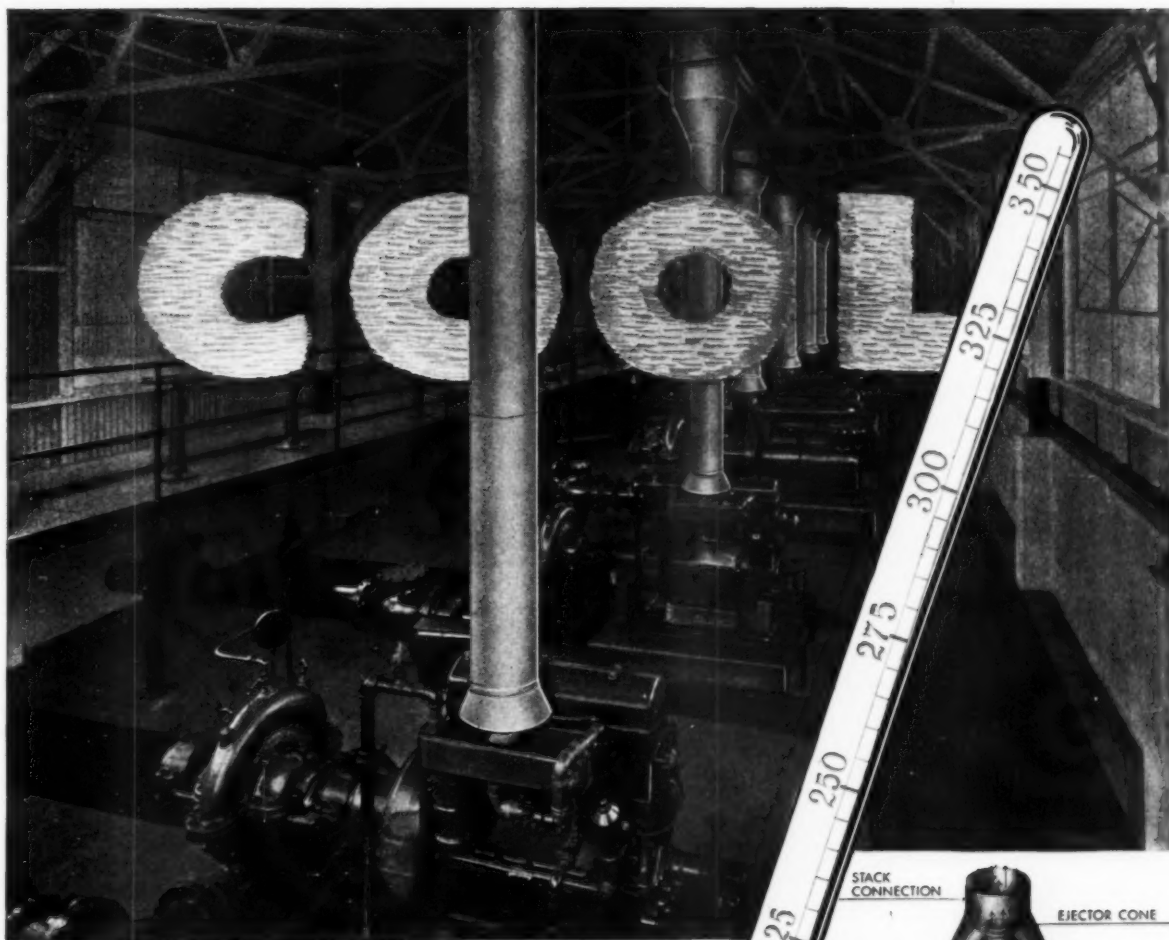


REINER Marine Auxiliary Unit.



JOHN REINER & COMPANY
12-12 37th AVENUE, LONG ISLAND CITY 1, N. Y.

1-RC-3



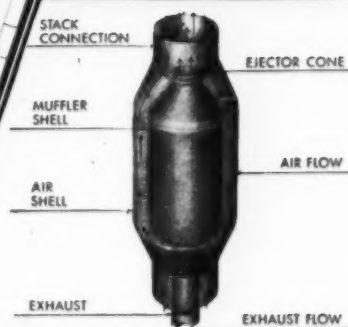
FLUOR AIR-COOLED MUFFLERS

Require no Insulation

EXHAUST OUTLET temperature from the Fluor Air-Cooled Muffler is approximately $\frac{1}{3}$ that of the conventional type, and can be made still cooler with minor changes in design. Corrosion is minimized, and muffler life increased accordingly. Fluor Air-Cooled Mufflers are cool because a high velocity stream of air is continually travelling the en-

tire length of the exhaust system. This air jacket eliminates the necessity for expensive insulation used in other type mufflers. No costly water cooling installation is required.

Fluor Air-Cooled Mufflers are designed to operate most efficiently in Diesel and Gas Engine service. Get the complete facts from any Fluor office.



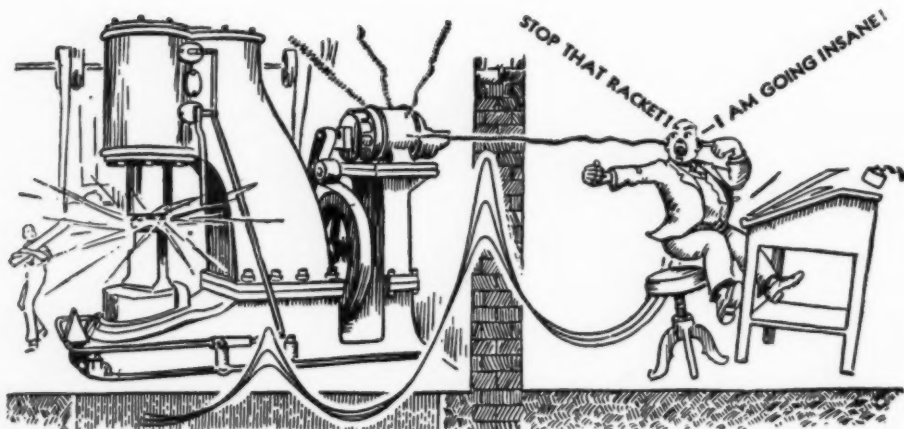
Phantom view of the Fluor Air-Cooled Muffler shows how a high-velocity, cool air stream is induced by the action of the hot exhaust gases at the ejector cone.

FLUOR

ENGINEERS • CONSTRUCTORS • MANUFACTURERS

THE FLUOR CORPORATION, LTD., 2500 SO. ATLANTIC BLVD., LOS ANGELES 22, CALIF. • New York, Pittsburgh, Kansas City, Houston





• FOR • VIBRATION and NOISE CONTROL

CONSULT CARL HUSSMAN, INC.

3001-09 N. OAKLEY AVENUE

CHICAGO

SIX MONTHS' TEST PROVES Boots Nuts Eliminate Periodic Tightening

"The sample Boots Nuts which you supplied have now been in use on several of our vehicles, both light and heavy, for a period of six months.

We selected two difficult spots for their application, drive shaft universal joint flanges and chassis spring U-bolts. At these points

plain nuts are not satisfactory unless a lock washer or jamb nut is used to hold them. Even so, they require periodic tightening.

The Boots Nuts in use have not required any attention since they were installed."

Signed,

UNITED PARCEL SERVICE



A portion of the 2900-truck fleet of United Parcel Service trucks serving 16 metropolitan cities

THIS report of a test made by the country's outstanding consolidated delivery company, operating in sixteen cities, is a clear-cut indication of the economies that Boots All-Metal, Self-Locking Nuts will effect in the transportation field after victory.

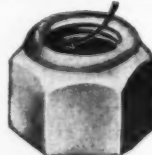
One piece, all-metal, Boots withstand the corrosive action of oil, water and chemicals. There's nothing to dry out, crack or shrink. Also, Boots Self-Locking Nuts can be used over and over without accelerated locking loss.

BOOTS SELF-LOCKING NUTS

"There's No Excuse for a Nut Shaking Loose"

Boots Aircraft Nut Corporation, General Offices, New Canaan, Conn.

The ALL-METAL lock is built in here



ROL-TOP. This style nut, now used on all types of aircraft engines, is the type of Boots All-Metal, Self-Locking Nut mentioned in the above letter.

American Locomotive Appoints Henry Schreck Consulting Engineer for Diesel Division



Henry Schreck

EFFECTIVE as of January 16, 1944 Mr. Henry Schreck has been appointed Consulting Engineer for the Diesel Engine Division of American Locomotive Co. at the main office in New York City. From 1914 to 1916 Mr. Schreck was Assistant Chief Engineer of the Fulton Iron Works, and from 1916 to 1917 was Chief Engineer of the same firm; from 1917 to 1918 Mr. Schreck was Consulting Engineer; from 1918 to 1920 he was Designing Engineer for the Ingersoll-Rand Co. with offices at Phillipsburg, N. J.; from 1920 to 1922 Mr. Schreck was Works Manager and Chief Engineer at the Lombard Governor Co. in Ashland, Mass.; from 1922 to 1927 he was Head Designing Engineer of the Henry L. Doherty (Combustion Utilities Co.) in New York; in 1928 he was Designing Engineer of the Rathbun-Jones Engineering Co. in Toledo, Ohio; from 1929 to 1930 Mr. Schreck was Division Engineer of the Fairbanks, Morse & Co. in Beloit, Wisconsin; from 1931 to 1936 Mr. Schreck was Consulting & Designing Engineer of the Ingersoll-Rand Co. in Painted Post, N. Y., and from 1936 to 1944 Mr. Schreck was Consulting & Designing Engineer of the Fairbanks, Morse & Co. at Beloit, Wisconsin.

Gray Releases New Films

THE Gray Marine Motor Company, Diesel Engine Division, announces four new technical films, 16 mm. with sound, produced in cooperation with the U. S. Naval Training School at Detroit and the Bureau of Ships. These are official Navy films.

These continue the series entitled "THE GRAY MARINE DIESEL GOES TO WAR," covering

general ma
Marine Die
invasion b
covering D
1942, and h
Schools.

The new in
General M
Removal an
Cleaning an
2 of the se
Detailed Ma

These engin
Ships by Gra
LCC, LCSS
Lighters. A
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to civilian use.

general maintenance on the Navy-style Gray Marine Diesel, as used in the landing craft and invasion barges. The first film in this series, covering Daily Maintenance, was produced in 1942, and has been widely used in the Training Schools.

The new films comprise three sections on the General Motors Unit Injector numbered (3) Removal and Replacement, (4) Operation, (5) Cleaning and Repair; plus one longer film (No. 2 of the series) covering General Service and Detailed Maintenance of the Engine.

These engines are supplied to the Bureau of Ships by Gray for use in the LCP, LCVP, LCM, LCC, LCSS and LCT Landing Craft and Tank Lighters. Accredited individuals may secure further information by addressing the company main office, Detroit 7, Mich.

Burgess-Manning Company Organized as Burgess Battery Company Subsidiary

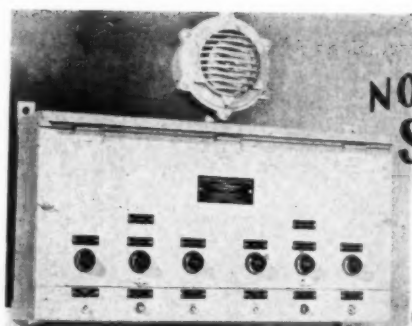
BURGESS-Manning Company was incorporated January 26, 1944, and, as a subsidiary of Burgess Battery Company, assumed the activities of the Acoustic Division of Burgess Battery Company on January 31st.

The newly elected officers are W. L. Manning, President; D. W. Day and R. L. Leadbetter, Vice Presidents; J. E. Lutz, Treasurer; H. H. Darbo, Secretary; E. D. Woisard, Assistant Treasurer and Assistant Secretary. Offices will be located at 2815 West Roscoe Street, Chicago.

The transfer involves no change in either personnel or policy, and Burgess-Manning Company will continue to develop, design, and supply all of the products formerly associated with the Acoustic Division.

In the field of noise prevention these include Burgess Exhaust and Air Intake Snubbers used on heavy duty stationary and marine type internal combustion engines, compressors, blowers, and vacuum pumps. In the field of sound absorption the products include Burgess Acousti-Confessionals and Burgess Acousti-Booths to facilitate communication in noisy industrial and marine locations.

The most recently developed product of Burgess-Manning Company is "Typha," a light-weight filling material obtained from the common marshland cattail. These light-weight, water resistant fibers are being used in cushions, life preservers, flying suits, and many other products essential to the war effort, as well as to civilian use.



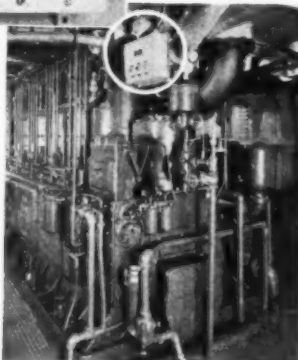
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Advantages from the use of the BROWN AUTOMATIC ALARM SYSTEM are many

The system is entirely automatic and does not depend upon manual operation of switches. In other words, no running back and forth to push buttons on the panel.

The Alarm sounds instantly on failure of either lube oil pressure or water temperature. Also, on starting engine, should no oil pressure be built up, alarm sounds within one minute or less if desired.

The system permits the engine to be maneuvered at will without sounding an alarm. The only time the alarm will sound is when the



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for Diesel Engines

Absolute Protection
Against Lube Oil or
Water Temperature
Failure

BROWN SYSTEM Installation aboard Tug "Duke"

Used on Maritime Commission, Army Transportation Corps, Coast Guard, Bureau of Ships Vessels.

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engine is running and a lube or water temperature failure takes place.

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The BROWN AUTOMATIC ALARM SYSTEM is available in two types—type "C" for single engine installations and type "E" for multiple engine installations.

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New Bulletin Describes "Universal" Automatic Engine Controller

ALEXANDER F. BARRON has issued a new bulletin describing the Universal Automatic Engine Controller, a device manufactured by Synchrono-Start Products, Inc., for the automatic control of Underwriters' centrifugal fire pumps driven by internal combustion engines or electric motors. The device also provides a continuous record of fire prevention system pressures and periodically tests the pumping unit without attention, but under suitable safeguards, the bulletin states. The entire Control equipment is mounted on a panel 22 in. wide, 48 in. high, weighing 200 lbs. In addition to starting engine starting equipment by pressure drop in the system the Controller may also be arranged for remote control of engines by impulses received from the opening of deluge valves, fire alarm systems, or failure of electric power with either manual or automatic shut-down arrangement. Write for a copy of Bulletin No. 144 to Alexander F. Barron, 59 E. Van Buren St., Chicago, Illinois.

Star Electric Motor Vice President Honored



Elvin E. Hallander

ELVIN E. HALLANDER, Vice-President and General Manager of Star Electric Motor Company and Star Equipment Corporation was elected a member of the Board of Managers of Bloomfield Savings Institution at the last meeting of the bank managers.

Bloomfield Savings Institution was established in 1871 and is the second largest savings bank in the State of New Jersey.

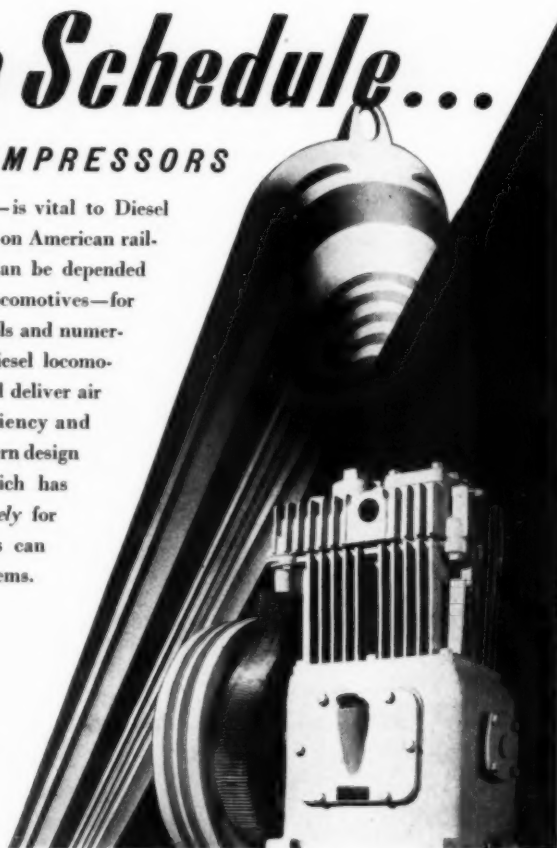
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There is six-figure mileage in your engines, if their oil is protected by WGB Oil Clarifiers. They cleanse the oil completely . . . by depth filtration . . . by traveling it farther. Deadly sludge, acid, grit, and carbon are eliminated, in the way contaminated surface water is purified by seeping through deep gravel. A WGB Refill costs less than an oil-change, and replacement is quickly made by hand, without the use of tools. Specify WGB for life-time service. It will save you new parts, oil, and time.



Send for the free booklet which shows WGB Oil Clarifier in action — illustrates the various models for all gas and Diesel engines.

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**American Bosch Appoints
Martin J. Berlyn**

THE American Bosch Corporation, Springfield, Mass., has announced the appointment of Martin J. Berlyn of Montreal as Vice-President in Charge of Engineering.

Although Mr. Berlyn has been connected with the Dominion Engineering Works, Ltd., of Montreal for the past fifteen years, latterly in the capacity of Manager and Chief Engineer of the Diesel Engine Division, he has been identified equally as much with the aviation industry and has only recently terminated his service with the Royal Canadian Air Force, where as a Squadron Leader and Chief Technical Instructor of the School of Aeronautical Engineering he has been in close touch with the engineering problems of military aviation in the present war.

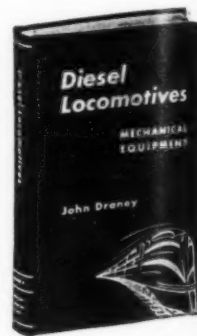


Martin J. Berlyn

Born in England in 1902, Mr. Berlyn attended the King Edward School at Birmingham before entering Trinity Hall at Cambridge University, from which he obtained his degree. His first position was with the British Lighting and Ignition Company, where he was engaged in research work on magnetos and automotive ignition systems. Subsequently, he was connected with Armstrong-Whitworth Aircraft, Coventry, England, Canadian-Vickers, Aircraft Division, Montreal, and Curtiss-Reid, Montreal. While Assistant Chief Engineer of Curtiss-Reid, he not only designed aircraft but did all of the test flying of new planes.

Mr. Berlyn started with the Dominion Engineering Works in 1929 as an engineer on hydraulic equipment and particularly hydro-turbines. In 1931 he became the engineer in

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Characteristics of Engine Cycles—Combustion Principles in Modern Diesels—Combustion in High-Speed Diesels—Fuel-Injection Nozzles—Fuel-Injection Pumps—Lubrication and Cooling Systems—Governors—Supercharging and Turbo-Charging—Air Filtration—Caterpillar Diesel—Cummins Diesel—Hercules Diesel—Cooper-Bessemer Diesel—American Locomotive (McIntosh & Seymour)—Baldwin Locomotive Diesel (De la Vergne)—General Motors Diesel-Electro-Motive Division—Fairbanks Morse High-Speed Diesel—Description and Operation of Mechanical Equipment—Maintenance Instructions—Trucks—Auxiliary Equipment—Vapor-Clarkson Steam Generation Units.

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charge of gear design, and in 1934 he was appointed Chief Engineer of the Diesel Engine Division, of which he later became also the manager. He comes to American Bosch directly from Dominion Engineering. In his new position he will have full charge of all design and development work on the fuel injection, ignition, and related products on which American Bosch specializes.

Rockford Divisions of Borg-Warner Receive Fourth White Star

MECHANICS Universal Joint Division of Borg-Warner Corporation has received the coveted White Star award for "continued and determined effort" in its production of war equipment. G. C. Gridley, president and general manager, has announced.

Notification of the award was received from Robert P. Patterson, under secretary of war, in a letter commending plant employees for the continued high calibre of their war effort. No ceremony attended the award. Copies of the notification simply were placed throughout the plant for the information of the 600 employees who participate in the honor.

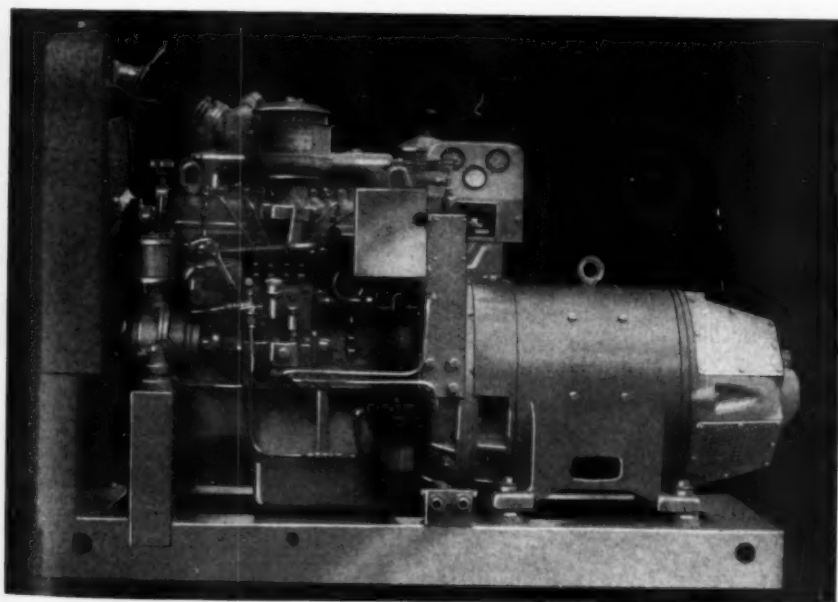
The award was the fourth of this nature to Borg-Warner Corporation divisions in the Rockford area. Earlier, the Army-Navy "E" was awarded Rockford Drilling Machine Division, which also received the White Star award on December 1st, 1943.

Baldwin Locomotive Appoints A. J. Tigges Manager of Consulting Engineering

APPOINTMENT of A. J. Tigges as manager of consulting engineering for all divisions and subsidiaries of The Baldwin Locomotive Works, Philadelphia, including Locomotive and Ordnance, Southwark, Standard and Foundries Divisions, The Pelton Water Wheel Co., and the Whitcomb Locomotive Co., is announced by Ralph Kelly, Baldwin president.

Besides his duties as general consultant, Mr. Tigges will have charge of the engineering of new products and new applications with reference to postwar plans.

Since his graduation from Massachusetts Institute of Technology in 1923, with a degree of Bachelor of Science in Electrical Engineering, Mr. Tigges has been associated with the engi-



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A simple, economical and foolproof method of restoring contaminated oil to the full value of new oil - for direct connecting to one or more Diesel engines for continuous or intermittent operation.



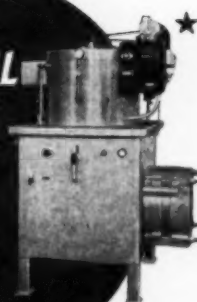
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neering firm of Jackson and Moreland, Boston, doing general engineering research and development work. He also represented that firm as managing engineer for a number of large power plants.

Before entering college, Mr. Tigges served a year in the United States Naval Reserve as a naval inspector. He was born in Mosinee, Wis.

Army-Navy "E" to Globe-Union

ON Sunday afternoon, January 9, Globe-Union Inc., Milwaukee, Wisconsin, manufacturers of Globe Spinning-Power Batteries, sparkplugs and radio parts, were the recipients of the much coveted Army-Navy "E" Award, before an audience of about 5,000 employees, their families and friends. Presentation of the award was made by Brig. Gen. Edgar Clewell, Commander of Western Signal Depots.



Globe-Union officials proudly display their newly acquired Army-Navy "E" pennant with the assistance of Army and Navy representatives.

Commander J. W. Guider, Washington, D. C., of the United States Navy, Bureau of Ships, pinned the first "E" pin on Chester O. Wanvig, president of Globe-Union, who also accepted the award for the company and its employees.

An interesting sidelight of the ceremony was the acceptance of the "E" pin for the women employees by Mrs. F. Moore who has four sons in the service. An 86-year-old chemist, R. W. Vicarey, received the pin for the veteran employees from a former Globe-Union employee, Pfc. Robert Wolf, who had been wounded in action.

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Absorbs vibration. Can't leak or burn out. No joints to loosen. No packing to rely on for tightness. In size 1" to 36" I.D., inclusive. With forged steel flanges or nipples in lengths desired, straight or bent to your specifications. Atlantic Hose is widely used in Industrial Plants, on Railroads, in Marine service and by the United States Navy.



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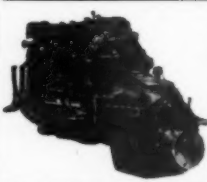
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1 to 6 cylinders, 25-165 H.P.

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Reduction Ratios to 4.4:1

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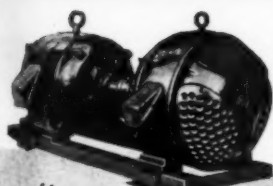
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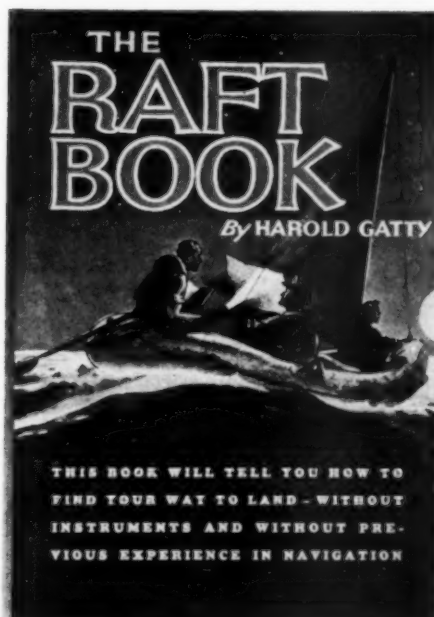
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Atlas Diesel Announces Civilian Edition of Gatty's "Raft Book"

LAST year Harold Gatty, of the famous globe
circling team of Post and Gatty, published a
handbook of Navigation Without Instruments,
which was so chock full of valuable information
that the Army Air Forces ordered copies in-
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flying the South Pacific.

A graduate of the Royal Australian Naval Col-
lege and for years a navigator in the Australian
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ple, non-technical language how those lost at
sea can most quickly make their way to land
by the observation of natural phenomenon.
Based primarily upon research into the methods
used by the Polynesians, who sailed unerringly
over thousands of miles of the South Pacific in
colonizing expeditions, Gatty's book is primar-
ily a compilation and description of trade
winds, currents, cloud types, wave forms, stars,
sea birds, fishes, and other bits of nature, to-
gether with the key to determining position at
any time from the careful observation of such
natural phenomenon.



Front cover of Harold Gatty's Raft Book

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Type M Thermostatic or Pressurestatic Contact Mak-
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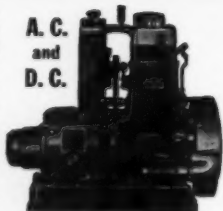
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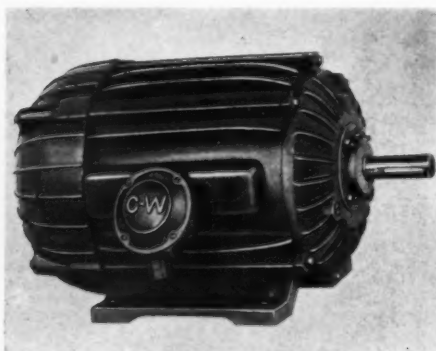
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Included are illustrations of 43 different species of sea birds, together with world maps showing currents, ocean temperatures, and seasonal winds. A separate large star map and world seas map accompany the book in a sturdy case.

Believing that the information contained therein would be of great interest to yachtsmen and fishermen, the Atlas Diesel Company has made arrangements for the printing of a civilian edition of Gatty's "Raft Book." Copies may be obtained from any Atlas Diesel office at \$3.25 each.

**Crocker-Wheeler Divn.
Announces New Motor**

THE Crocker-Wheeler Division of the Joshua Hendy Iron Works announces the release of its Sealedpower, corrosion-resistant motor. This motor is suitable for operation in atmospheres containing injurious dusts, corrosive vapors or gasses, and excessive moisture, such as are often encountered in chemical plants, textile mills, food plants and mines.



New Crocker-Wheeler Sealedpower motor.

Available in sizes from one to fifteen horsepower, the Sealedpower motor can be furnished for operation from any polyphase power supply. The Sealedpower motor is of the totally enclosed, fan cooled type, but the design departs from previous models in that there are no cooling ducts to become fouled with wet or sticky

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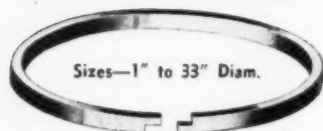
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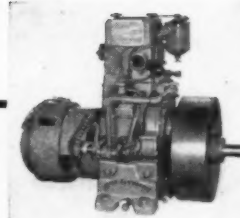
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